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USER'S MANUAL OF THE PROGRAM NPBOS

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USER'S MANUAL OF THE PROGRAM NPBOS

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This manual presents how one can calculate energy levels, wave functions, and electro-magnetic matrix elements within the Interacting Boson Model version 2 (IBM-2) by using the program package NPBOS. Various recent revisions of the program are described also.

Keywords : Interacting Boson Model, IBM, IBA, NPBOS, User's Manual

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プログラムＮＰＢＯＳのユーザーズ・マニュアル

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（１９８５年６月１４日受理）

このマニュアルは，プログラム・パッケージＮＰＢＯＳを用いる事により，相互作用するボゾン模型バージョン２（ＩＢＭ－２）に基いて，エネルギー・レベル，波動関数，及び電磁遷移行列要素を計算する方法を示している。最近行なわれたプログラムの様々な改訂についても述べられている。

＋）　この仕事は部分的に，ロスアラモス国立研究所理論部に於いて，米国エネルギー省の援助のもとに行なわれた。

＊）　理化学研究所サイクロトロン研究室，及び東京大学理学部情報科学科。

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I. INTRODUCTION

The program NPBOS diagonalizes the Hamiltonian of the Interacting Boson Model version 2 (IBM-2)[1]. Electro-magnetic matrix elements between eigenstates are calculated by the program NPBTRN. Calculations by NPBOS have been reported in many literatures. Some examples are found in Refs. 1-7, where the outline of phenomenological fit to experimental data is described.

The program NPBOS was coded by T. Otsuka in 1976, with the program NPBTRN coded by O. Scholten and T. Otsuka. Both programs have been revised by N. Yoshida and T. Otsuka in 1983, and finally by T. Otsuka in 1985.

This latest version of NPBOS has the following advantages over the previous versions;

(i) Capability of calculating F·F, i.e., squared magnitude of F-spin for eigenstates of a general IBM-2 Hamiltonian.

(ii) Being much faster because of efficient treatment of Racah coefficients and d-boson one-body operator matrix elements. They are stored in memory and on file in order to avoid repeated calculations of the same quantity.

(iii) Compact listing.

(iv) Capability of calculating more (up to 20) eigenstates for a given angular momentum.

(v) Date and time of the calculation are printed on the summary page of the output.

(vi) Transparent definition of the Majorana interaction which has been causing some confusion. See sect. 2.5.

II. THE PROGRAM NPBOS.

§ 2.1. Structure of the program NPBOS. (Fig. 1)

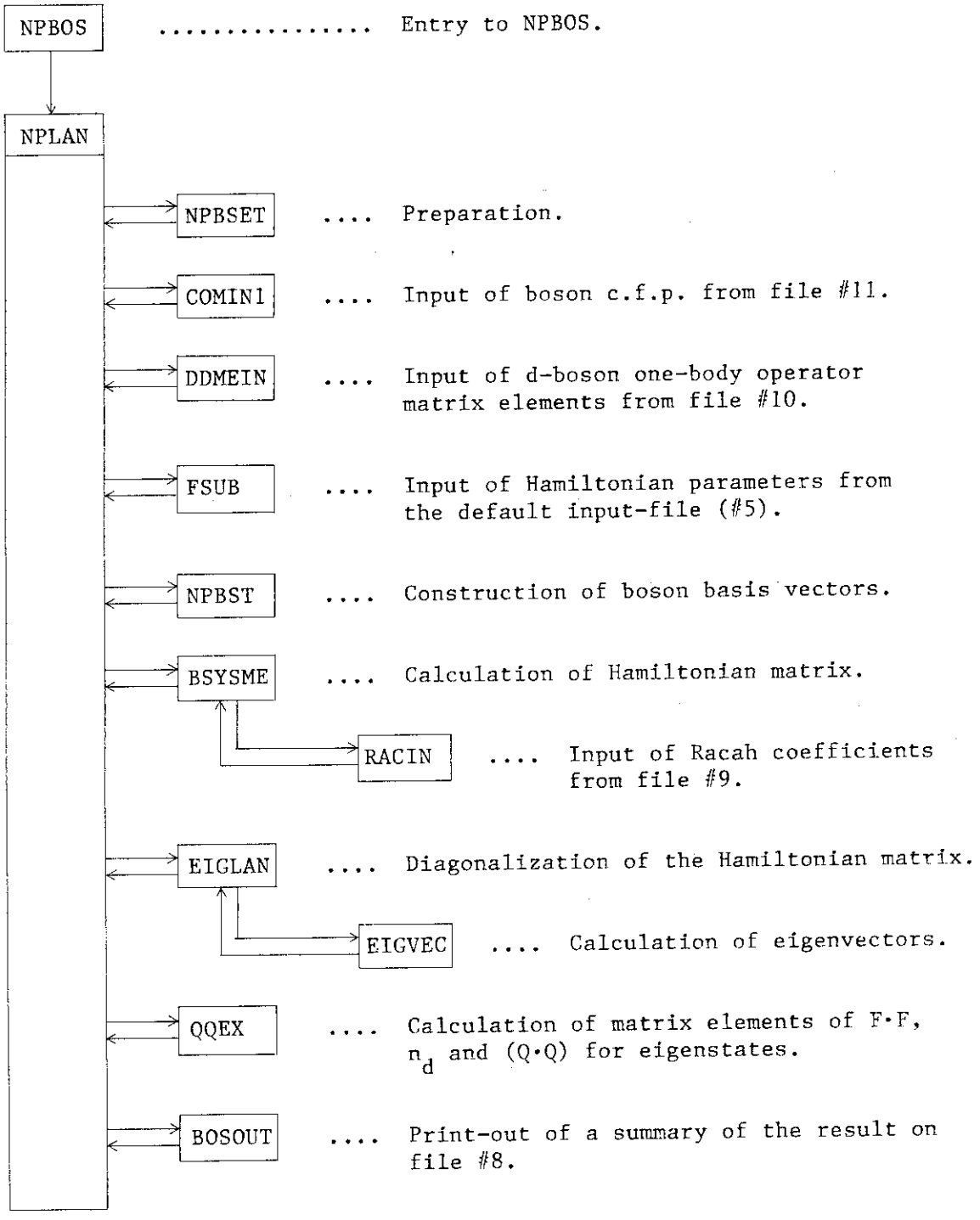

Fig. 1 Structure of the program NPBOS.

§ 2.2. Files.

Files in Table I are required. File #3 may not be needed for calculations with small number of bosons.

Table I Files for NPBOS

File #*	Status	Contents
3	Temporary**	Storage of matrix elements of the Hamiltonian.
5	Input (Formatted)	Input data. (Boson Hamiltonian parameters, etc.)
6	Printer	Print-out of details of calculation.
8	Printer	Print-out of summary of calculation.
9	Permanent	Input of Racah coefficients.
10	Permanent	Input of d-boson one-body operator matrix elements.
11	Permanent	Input of boson c.f.p.'s.
13	Temporary	Storage of Lanczos basis vectors.
14	Temporary	Storage of eigenvectors.
20	Output	Eigenvectors. If electro-magnetic transition matrix elements are calculated, this file must be transferred to the NPBTRN run.

*) These numbers indicate file numbers used in FORTRAN programs.

**) Large space may be required depending on dimension of the boson space. Large block size of this file will save the turn-around time.

§ 2.3. Input data.

The following parameters should be inputted from file #5 which is a formatted file (card image).

(1) Namelist N

Table II shows control variables which are inputted from Namelist N. The print-out level parameters in Table II can take values of 0, 1 or 2. In general, no or minimum print-out is obtained by 0, some moderate output is obtained by 1, and full information can be obtained by 2. The default value is 0 except IWCF.

Table II Control variables in NPBOS

Variable Name	Contents
ICMW	Print-out level of boson c.f.p.'s.
NPSTW	Print-out level of quantum numbers of boson basis vectors.
IWCF	Print-out level of eigenvectors. (Default = 1). Output examples are attached for each value of IWCF. (See Ch. III).
LAUTO	Array of the angular momentum of eigenstates to be calculated. Numbers before the first negative number are inputted. (No default).
NEIGA	Array of the number of eigenstates for each value of LAUTO. If not specified, the last non-zero input for NEIGA is taken. If not input at all, the default value is 5.
NDUPTA	Array of the allowed maximum total d-boson number for each of LAUTO. If not specified, the last non-zero input is taken. If not input at all, the possible maximum number becomes default.
ISYM	Choice of the initial trial vector in the Lanczos diagonalization.* 0 : Mixed-symmetry trial vector. (Default) > 0 : Symmetric trial vector in the ISYM-th d-boson configuration. < 0 : Antisymmetric trial vector in the |ISYM|-th d-boson configuration. The use of the default value is suggested. For details, contact the authors.
NCUT	The number of iterations in the Lanczos diagonalization.** (Default = 30).
IEX	Matrix elements of F·F, n_d and (Q·Q) between eigenstates.*** 0 : No calculation. 1 : Only F·F is calculated. (Default). 2 : F·F, n_d and (Q·Q) are calculated.

This calculation may be skipped automatically for some highest states of a given angular momentum, because of limited memory space.

---

*) The symmetry here refers to proton- and neutron-boson degrees of freedom.

**) Larger NCUT is required to obtain more eigenstates with sufficient accuracy for a fixed angular momentum. NCUT is limited up to 100, since numerical round error is accumulated for too large NCUT. (See Ch. III.)

***) F•F means the squared magnitude of F-spin. The diagonal matrix elements of F·F are shown also on the summary page. The F-spin was introduced originally in Ref. 8, and is explained in Refs. 7-10.

(2) Mass number and element name of the nucleus.
(Input Format : A3, 1X, A2).
The mass number and element name are printed as the header of the summary of the result. They are transferred to the NPBTRN run, and printed.

(3) Numbers of neutron bosons and proton bosons.
(Input Format : 2I5).

(4) Number of experimental energy levels. (NEXP)
(Input Format : I5).

(5) If NEXP = 0, skip this step.
Otherwise, repeat the following input NEXP times :
Angular momentum, parity, order within the same angular momentum, experimental energy. (Input Format : I5, 1X, A1, 1X, I1, F12.5).

(6) Namelist INPT.
The boson Hamiltonian parameters are inputted. See the next section.

(7) A blank card.

(8) "E" in the first column.

§ 2.4. Hamiltonian.

The following Hamiltonian can be treated by NPBOS. Table III shows the variable name in NPBOS which corresponds to the variable name in this Hamiltonian.

$$
\begin{aligned}
H = {} & \zeta \\
& + (\varepsilon_d + \varepsilon_{d_\nu}) n_{d_\nu} + (\varepsilon_d + \varepsilon_{d_\pi}) n_{d_\pi} + \kappa (Q_\nu \cdot Q_\pi) + \kappa_\nu (Q_\nu \cdot Q_\nu) + \kappa_\pi (Q_\pi \cdot Q_\pi) \\
& + \frac{1}{2} \xi_2 \, (d_\nu^\dagger s_\pi^\dagger - d_\pi^\dagger s_\nu^\dagger) \cdot (\tilde{d}_\nu s_\pi - \tilde{d}_\pi s_\nu) \\
& + \sum_{K=1,3} \xi_K \, ([d_\nu^\dagger d_\pi^\dagger]^{(K)} \cdot [\tilde{d}_\pi \tilde{d}_\nu]^{(K)}) + \sum_{L=0}^{4} g_{\pi\nu}^{(L)} \, ([d_\nu^\dagger d_\pi^\dagger]^{(L)} \cdot [\tilde{d}_\pi \tilde{d}_\nu]^{(L)}) \\
& + \frac{1}{2} \sum_{L=0,2,4} c_\nu^{(L)} ([d_\nu^\dagger d_\nu^\dagger]^{(L)} \cdot [\tilde{d}_\nu \tilde{d}_\nu]^{(L)}) + \frac{1}{2} \sum_{L=0,2,4} c_\pi^{(L)} ([d_\pi^\dagger d_\pi^\dagger]^{(L)} \cdot [\tilde{d}_\pi \tilde{d}_\pi]^{(L)}) \\
& + \mu_{ss} n_{s_\nu} n_{s_\pi} + \mu_{ds} n_{d_\nu} n_{s_\pi} + \mu_{sd} n_{s_\nu} n_{d_\pi} + \mu_{dd} n_{d_\nu} n_{d_\pi} \\
& + \lambda_\nu n_{d_\nu} (Q_\pi \cdot Q_\pi) + \lambda_\pi n_{d_\pi} (Q_\nu \cdot Q_\nu) \\
& + \sum_K f^{(K)} ([d_\nu^\dagger \tilde{d}_\nu]^{(K)} \cdot [d_\pi^\dagger \tilde{d}_\pi]^{(K)}) \\
& + \omega_{\nu\nu} (L_\nu \cdot L_\nu) + \omega_{\pi\pi} (L_\pi \cdot L_\pi) + \omega_{\nu\pi} (L_\nu \cdot L_\pi) \qquad (2.1) \\
& + w_\nu \frac{1}{2} \{ ([d_\nu^\dagger d_\nu^\dagger]^{(0)} \cdot s_\nu s_\nu) + \text{h.c.} \} + y_\nu \frac{1}{\sqrt{2}} \{ ([d_\nu^\dagger d_\nu^\dagger]^{(2)} \cdot \tilde{d}_\nu s_\nu) + \text{h.c.} \} \\
& + w_\pi \frac{1}{2} \{ ([d_\pi^\dagger d_\pi^\dagger]^{(0)} \cdot s_\pi s_\pi) + \text{h.c.} \} + y_\pi \frac{1}{\sqrt{2}} \{ ([d_\pi^\dagger d_\pi^\dagger]^{(2)} \cdot \tilde{d}_\pi s_\pi) + \text{h.c.} \}
\end{aligned}
$$

with

$$
Q_\tau = d_\tau^\dagger s_\tau + s_\tau^\dagger \tilde{d}_\tau + \chi_\tau [d_\tau^\dagger \tilde{d}_\tau]^{(2)} \quad , \quad \tau = \nu, \pi \qquad (2.2)
$$

where ζ denotes a constant term, n_s and n_d stand respectively for the number operators of the s and d bosons, and L_ν (L_π) means the neutron (proton) boson angular momentum operator;

$$
L_\tau = \sqrt{10} \, [d_\tau^\dagger \tilde{d}_\tau]^{(1)}, \quad \tau = \nu, \pi \, . \qquad (2.3)
$$

Table III Input Parameters (Namelist INPT)

Variable Name in NPBOS	Variable Name in Hamiltonian	Typical Value or Range
EFIX	ξ	0.0
ED	ε_d	0.5~1.0 (MeV)
EDN	ε_{d_ν}	0.0
EDP	ε_{d_π}	0.0
RKAP	κ	-0.08~ -0.25 (MeV)
RKNN	κ_ν	0.0
RKPP	κ_π	0.0
RKMJ[a)]	ξ	0.0 ∿ 0.8 (MeV)
RKMJ1	ξ_1	0.0 ∿ 0.8 (MeV)
RKMJ2	ξ_2	0.0 ∿ 0.8 (MeV)
RKMJ3	ξ_3	0.0 ∿ 0.8 (MeV)
CHN	χ_ν	-1.2~ +1.2
CHP	χ_π	-1.2~ +1.2
GNP(K)	$g_{\nu\pi}^{(K)}$	0.0 (K=0,4)
CON	$c_\nu^{(0)}$	0.0
C2N	$c_\nu^{(2)}$	0.0
C4N	$c_\nu^{(4)}$	0.0
C0P	$c_\pi^{(0)}$	0.0

C2P	$c_{\pi}^{(2)}$	0.0
C4P	$c_{\pi}^{(4)}$	0.0
VXX(K)	$f^{(K)}$	0.0 (K=0,4)
HEX[b]	$f^{(4)}$	0.0
RLNN	$\omega_{\nu\nu}$	0.0
RLPP	$\omega_{\pi\pi}$	0.0
RLNP	$\omega_{\nu\pi}$	0.0
SNSP	μ_{ss}	0.0
DNSP	μ_{ds}	0.0
SNDP	μ_{sd}	0.0
DNDP	μ_{dd}	0.0
FEQ(1)	λ_{ν}	0.0
FEQ(2)	λ_{π}	0.0
VWN	w_{ν}	0.0
VYN	y_{ν}	0.0
VWP	w_{π}	0.0
VYP	y_{π}	0.0
ISU3[c]		0 or 1

a) ξ_i = RKMJ ($= \xi$) + RKMJi for i = 1, 2 and 3.

b) Added to VXX(4).

c) An SU(3) Hamiltonian is generated for ISU3 = 1. The strength of the quadrupole interaction is taken from RKAP. CHN = CHP = $-\sqrt{7}$ / 2. RLNN, RLPP and RLNP can be added.

Note : All variables are zero-cleared just before the namelist INPT is read.

§ 2.5. Majorana interaction.

In this version of NPBOS, the strength parameters of the Majorana interaction are defined so as to be equal to the corresponding matrix elements of anti-symmetric pairs of s- and d-bosons (i.e. F=0 boson pairs). A positive value of any of the three strength parameters yields repulsive effects on mixed-symmetry states, although the amount of the effects depends on individual mixed-symmetry states.

The strength parameters of the Majorana interactions ξ_1, ξ_2 and ξ_3 are actually defined as,

$$\xi_L = (d_\nu d_\pi;\ L\ |V|\ d_\nu d_\pi;\ L\ ), \quad L = 1 \text{ and } 3, \tag{2.4}$$

and

$$\xi_2 = (\ (d_\nu s_\pi - s_\nu d_\pi)/\sqrt{2}\ \ |\ V\ |\ (d_\nu s_\pi - s_\nu d_\pi)/\sqrt{2}\ ), \tag{2.5}$$

where the bra- and ket-vectors are normalized. The Majorana parameters ξ_1, ξ_2 and ξ_3 are thus equal to the corresponding normalized two-boson matrix elements. This definition is the same as that taken in Ref. 7. As stated above, a positive value of these parameters pushes up mixed-symmetry states.

In some literatures[11], the Majorana interaction is defined as,

$$\begin{aligned} M = {} & 2 \sum_{L=1,3} \xi_L' \ ([d_\pi^\dagger d_\nu^\dagger]^{(L)} \ [\tilde{d}_\nu \tilde{d}_\pi]^{(L)}) \\ & + 2\, \xi_2' \ \tfrac{1}{2}\ (d_\nu^\dagger s_\pi^\dagger - s_\nu^\dagger d_\pi^\dagger)\ (\tilde{d}_\nu s_\pi - s_\nu \tilde{d}_\pi). \end{aligned} \tag{2.6}$$

Clearly, $\xi_L' = \frac{1}{2}\ \xi_L$ for L=1, 2 and 3. There are some other definitions. One has to be careful about sign and a factor two in the Majorana interaction.

III. EXAMPLES OF THE NPBOS RUN

Some examples of the NPBOS run are shown after the main text. Table IV shows their contents and page numbers. There are two calculations. The first one is a calculation for ^{148}Sm which was reported in Ref. 7. Three different listings of this calculation are shown for IWCF = 0, 1 and 2 (see sect. 2.3.). The other listing is for the SU(3) limit.

The Hamiltonian is diagonalized by the Lanczos method. The convergence of the diagonalization can be examined by convergence of eigenvalues as shown on page E10. The convergence of the diagonalization is expected if amplitudes in the Lanczos basis are well converged (see pages E43 - E47). The allowed maximum number of iterations in the Lanczos diagonalization is controlled by variable NCUT (see sect. 2.3.).

Table IV Examples

EXAMPLE #	SYSTEM	CONTENTS	PAGE
1	^{148}Sm	Input Image	E1
		Summary of output of NPBOS	E3
		Output of NPBTRN	E5
		Output of NPBOS (IWCF=1)	E8
2		Output of NPBOS (IWCF=0)	E22
3		Output of NPBOS (IWCF=2)	E28
4	SU(3) limit	Input Image	E57
		Summary of output of NPBOS	E59
		Output of NPBTRN	E61
		Output of NPBOS (part; IWCF=1)	E64

IV. THE PROGRAM NPBTRN.

§ 4.1. Structure of the program NPBTRN. (Fig. 2)

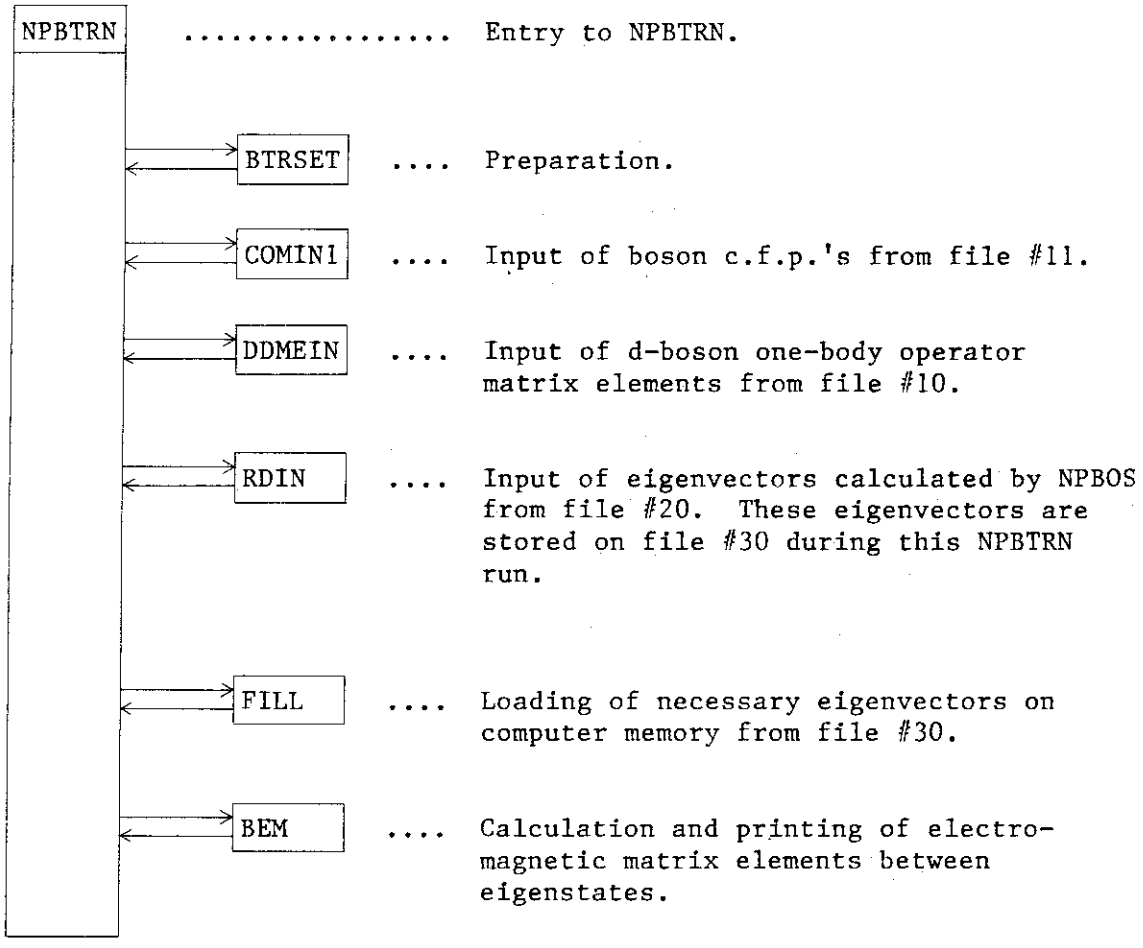

Fig. 2 Structure of the program NPBTRN.

§ 4.2. Files.

Files in Table V are required by the program NPBTRN.

Table V. Files for NPBTRN.

File #	Status	Contents
5	Input (Formatted)	Input data. (Boson charges, etc.)
6	Temporary (Formatted)	Check of the Racah subprogram. This file can be virtual.
8	Printer	Print-out of result.
10	Permanent	Input of d-boson one-body operator matrix elements.
11	Permanent	Input of boson c.f.p.'s.
20	Input (Binary)	Eigenvectors calculated by NPBOS. This file should be transferred from NPBOS.
30	Temporary	Storage of eigenvectors.

§ 4.3. Transition operators.

The E2 transition operator is defined as,

$$T^{(E2)} = e_\nu^B \{ (d_\nu^\dagger s_\nu + s_\nu^\dagger \tilde{d}_\nu) + XN \ [d_\nu^\dagger \tilde{d}_\nu]^{(2)} \} + e_\pi^B \{ (d_\pi^\dagger s_\pi + s_\pi^\dagger \tilde{d}_\pi) + XP \ [d_\pi^\dagger \tilde{d}_\pi]^{(2)} \}, \quad (4.1)$$

where e_ν^B and e_π^B are neutron and proton boson charges, and XN and XP are coefficients. The boson charges are inputted at the step (5) in sect. 4.4. In the default mode, XN and XP are set equal to χ_ν (CHN) and χ_π (CHP) of the Hamiltonian, respectively (see sect. 2.4.). This is done in the IPARM=blank mode (see next section). The coefficients XN and XP can explicitly be inputted by putting IPARM = any character except blank.

The M1 transition operator is defined as,

$$T^{(M1)} = \sqrt{\frac{3}{4\pi}} \{ g_\nu L_\nu + g_\pi L_\pi \} \qquad (4.2)$$

where L_ν and L_π are neutron and proton boson angular momentum operators ($L_\tau = \sqrt{10}\,[d_\tau^\dagger \tilde{d}_\tau]^{(1)}$, $\tau = \nu, \pi$), and g_ν and g_π are neutron and proton boson g-factors.

The other transition operators of multipolarity K are defined as,

$$T^{(K)} = e_\nu^{B(K)}\,[d_\nu^\dagger \tilde{d}_\nu]^{(K)} + e_\pi^{B(K)}\,[d_\pi^\dagger \tilde{d}_\pi]^{(K)}, \qquad (4.3)$$

where $e_\tau^{B(K)}$ ($\tau = \nu, \pi$) denotes boson charge of multipolarity K.

§ 4.4. Input data.

The following parameters should be inputted from file #5 which is a formatted file (card image).

(1) MUL, IPARM, ILIST (Input Format : I2, 1X, A1, I2)

MUL : Miltipolarity of electro-magnetic transition.

ex. E2 ... MUL = 2

M1 ... MUL = 1

If MUL < 0, the program stops.

IPARM : If IPARM = blank, skip the next input (2). See the previous section for further explanation.
Otherwise, the step (2) is executed.
The default value is blank.

ILIST : If ILIST = 0, only transitions specified in the step (4) are calculated. This is default.
If ILIST = 1, all possible transitions given in the step (6) are calculated.

(2) XN, XP (Input Format : 2F10.4)

See the previous section.

(3) Number of experimental data. (NEXP)

(Input Format : I2)

(4) If NEXP = 0, skip this step.

Otherwise, repeat the following input NEXP times.

J_i, N_i, J_f, N_f, I, DATA, ERROR
(Input Format : 2I2, 2X, 2I2, 1X, A1, 2F13.7)

i : initial state

f : final state

J : angular momentum

N : order within the same angular momentum

I : used in the ILIST=0 mode. If this is equal to blank, experimental data (i.e. DATA and ERROR) are read and compared to calculation. Otherwise, no experimental data is read, and only calculated result is shown in the output. Refer to ILIST in the step (1).

DATA : experimental data

ERROR : error

(5) Neutron and proton boson charges (e_ν^B and e_π^B in eqs. (4.1) and (4.3)), or boson g-factors for M1 transitions (g_ν and g_π in eq. (4.2). (Input Format : 2F10.4)

(6) J_i and J_f (Input Format : 2I5)
This input can be repeated.
If $J_i < 0$, the program goes to the step (1).

V. EXAMPLES OF THE NPBTRN RUN.

Examples are shown after the main text. See Chap. III.

VI. HOW TO CHANGE DIMENSIONS OF MAJOR ARRAYS.

Dimensions of major arrays of NPBOS can be changed easily by changing PARAMETER statement in the main program of NPBOS. The default values are,

IHSTR = 30000 (storage of matrix elements on array memory. The actual number of the matrix elements can exceed IHSTR by using disk file.)

IVSTR = 4000 (storage of state vectors)

J_i, N_i, J_f, N_f, I, DATA, ERROR
(Input Format : 2I2, 2X, 2I2, 1X, A1, 2F13.7)

i : initial state

f : final state

J : angular momentum

N : order within the same angular momentum

I : used in the ILIST=0 mode. If this is equal to blank, experimental data (i.e. DATA and ERROR) are read and compared to calculation. Otherwise, no experimental data is read, and only calculated result is shown in the output. Refer to ILIST in the step (1).

DATA : experimental data

ERROR : error

(5) Neutron and proton boson charges (e_ν^B and e_π^B in eqs. (4.1) and (4.3)), or boson g-factors for M1 transitions (g_ν and g_π in eq. (4.2). (Input Format : 2F10.4)

(6) J_i and J_f (Input Format : 2I5)
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IHSTR = 30000 (storage of matrix elements on array memory. The actual number of the matrix elements can exceed IHSTR by using disk file.)

IVSTR = 4000 (storage of state vectors)

J_i, N_i, J_f, N_f, I, DATA, ERROR
(Input Format : 2I2, 2X, 2I2, 1X, A1, 2F13.7)

i : initial state

f : final state

J : angular momentum

N : order within the same angular momentum

I : used in the ILIST=0 mode. If this is equal to blank, experimental data (i.e. DATA and ERROR) are read and compared to calculation. Otherwise, no experimental data is read, and only calculated result is shown in the output. Refer to ILIST in the step (1).

DATA : experimental data

ERROR : error

(5) Neutron and proton boson charges (e_ν^B and e_π^B in eqs. (4.1) and (4.3)), or boson g-factors for M1 transitions (g_ν and g_π in eq. (4.2). (Input Format : 2F10.4)

(6) J_i and J_f (Input Format : 2I5)
This input can be repeated.
If $J_i < 0$, the program goes to the step (1).

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IVSTR = 4000 (storage of state vectors)

VII. PREPARATION OF INPUT DATA FILES

Files of the following data should be prepared before NPBOS run.

§ 7.1. c.f.p.

The boson c.f.p. file can be created by executing the program CFPGEN and NPCFPG. The former calculates one-body c.f.p.'s, while the latter two-body c.f.p.'s.

(a) CFPGEN

No input is necessary. The one-body c.f.p.'s for states of up to eleven d-bosons are calculated and written on file #3. Files required are shown in Table VI.

Table VI Files for CFPGEN

File #	Status	Contents
1	Temporary	Working area.
2	Printer	For checking.
3	Output (Binary)	One-body c.f.p.'s. Transferred to the NPCFPG run.

(b) NPCFPG

The maximum number of d-bosons should be inputted from file #5 by the format "I5". This number is limited up to 11 at present. The resultant two-body c.f.p.'s are written on file #11 in addition to inputted one-body c.f.p.'s. Files in Table VII are required.

Table VII. Files for NPCFPG

File #	Status	Contents
2	Printer	For checking.
3	Input	One-body c.f.p.'s. Transferred from the CFPGEN run.
5	Input	Maximum number of d-bosons.
6	Printer	For checking.
7	Temporary	Working area.
11	Output (Binary)	One-body and two-body c.f.p.'s.

§ 7.2. Racah coefficient.

The program RACFL calculates Racah coefficients needed by NPBOS, and store them on file #IFILE which should be binary. The following parameters should be inputted;

MAXND, LTMAX, IFILE (Input Format : 3I5)

MAXND : Maximum number of d-bosons.
LTMAX : Maximum total angular momentum for which Racah coefficients are provided by the output file. For total angular momentum LTMAX, Racah coefficients are calculated individually in NPBOS.
IFILE : File # of the output file.

§ 7.3. d-boson one-body operator matrix element.

The program DDMEFL calculates d-boson one-body operator matrix elements, and store them on file #12 which should be binary. This program needs the c.f.p. file created by NPCFPG as file #11. The following parameter should be inputted;

MAXND (Input Format : I5)

MAXND : Maximum number of d-bosons.

VIII. CONVERSION TO CDC

(1) The IBM/VAX/FACOM computer is a 4-byte machine, while CDC is a 60-bit machine. The present program is written in the IBM/VAX/FACOM version. The statements, REAL*4 and REAL*8, should be removed.

(2) Masking statements should be changed as,

```
IAND( I, J ) → I .AND. J
IOR ( I, J ) → I .OR. J
```

IX. REFERENCES

1) T. Otsuka, A. Arima, F. Iachello, and I.Talmi, Phys. Lett. 76B (1978) 139.
2) F. Iachello, ed., "Interacting Bosons in Nuclear Physics", (Plenum, New York, 1979); A.Arima and F.Iachello, in Adv. Nucl. Phys. vol.13 ed. by J.W. Negele and E. Vogt (Plenum, New York, 1984), p. 139.
3) G. Puddu, O. Scholten, and T. Otsuka, Nucl. Phys. A348 (1980) 109.
4) R. Bijker, A.E.L. Dieperink, O. Scholten, and R. Spanhoff, Nucl. Phys. A344 (1980) 207.
5) P. van Isacker and G. Puddu, Nucl. Phys. A348 (1980) 125.
6) U. Kaup and A. Gelberg, Z. Physik A293 (1979) 311.
7) T. Otsuka and J.N. Ginocchio, Phys. Rev. Lett. 54 (1985) 777.
8) A. Arima, T.Otsuka, F. Iachello, and I. Talmi, Phys. Lett. 66B (1977) 205.
9) T. Otsuka, A. Arima, and F. Iachello, Nucl. Phys. A309 (1978) 1.
10) F. Iachello, Phys. Rev. Lett. 53 (1984) 1427.
11) For example, O. Scholten, K. Heyde, P. van Isacker, J. Jolie, J. Moreau, and M. Waroquier, Nucl. Phys. A438 (1985) 41.

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4) R. Bijker, A.E.L. Dieperink, O. Scholten, and R. Spanhoff, Nucl. Phys. A344 (1980) 207.
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6) U. Kaup and A. Gelberg, Z. Physik A293 (1979) 311.
7) T. Otsuka and J.N. Ginocchio, Phys. Rev. Lett. 54 (1985) 777.
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10) F. Iachello, Phys. Rev. Lett. 53 (1984) 1427.
11) For example, O. Scholten, K. Heyde, P. van Isacker, J. Jolie, J. Moreau, and M. Waroquier, Nucl. Phys. A438 (1985) 41.

```
$ASS SM8HMLT.DAT FOR003
$ASS RAC6.DAT FOR009
$ASS DDMEFL.DAT FOR010
$ASS CFP2.DAT FOR011
$ASS SM8VEC.DAT FOR020
$ASS SM8SEBL.DAT FOR013
$ASS SM8IVEC.DAT FOR014
$ASS OUT2SM148.DAT FOR008
$ASS OUTSM148.DAT FOR006
$RUN NPBOS
 $N  NCUT=80,   IEX= 1,
     LAUTO = 0, 2, 4, 1, -6, 1, 3, -5,  -1,
     NEIGA = 4, 6, 4,  1,
     NDUPTA= 8, 8, 8, 8, 8, 8, 8, 7,
     IWCF= 1,  NPSTW= 0,
 $END
148 SM
    2    6
    8
    0 + 1  0.0
    2 + 1  0.550
    4 + 1  1.180
    6 + 1  1.906
    8 + 1  2.545
    0 + 2  1.426
    2 + 2  1.454
    2 + 3  1.664
 $INPT
      ED   =  1.000,
      EDN  =  0.000,
      EDP  = -0.000,
      RKAP = -0.140,
      CHN  = -0.800,
      CHP  = -0.800,
      RMAJ1=  0.100,
      RMAJ3=  0.100,
 $END

E
$DEL SM8SEBL.DAT.*
$DEL SM8IVEC.DAT.*
$DEL SM8HML*.DAT.*
$ASS BT2SM148.DAT FOR008
$ASS BTSM148.DAT FOR006
$ASS SM8VC030.DAT FOR030
$RUN NPBTRN.EXE
 2
 8
 0 1   2 1   0.729        0.030
 0 1   2 2   0.045        0.005
 0 1   2 2   0.075        0.010
 0 1   2 3   0.030        0.01
 4 1   2 1   0.250        0.070
 2 2   2 1   0.089        0.015
 2 1   2 1  -0.73         0.38
 2 1   2 1  -0.97         0.27
 0.057     0.128
    0    2
    2    2
    4    2
    6    4
    3    2
```



```
   -1   -1
 1
 2
 2 1   2 1 *
 0 1   1 1 *
 -0.35       0.85
    2    2
    0    1
   -1   -1
-1
$DEL SM8VC*.DAT.*
```

```
  *----------*
  *  148     *
  *      SM  *
  *----------*

***  PARAMETERS  IN  THE  HAMILTONIAN  ***

   RKAP : -0.140     HEX  :  0.000     EFIX :  0.000
   CHN  : -0.800     CHP  : -0.800
   RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
   ED   :  1.000     EDN  :  0.000     EDP  :  0.000
   MAJ  :  0.000     S-D  :  0.000     J=1 : 0.100     J=3 : 0.100
   RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 0

DATE : 29-MAR-85     TIME :  10:08:57

CPU-TIME :      46 (SEC)        FINISHED AT 10:09:54

NPBOS VERSION : MAR-85 / LOS ALAMOS-TOKAI / TAKA OTSUKA

*****************************************************************
***      2 - NEUTRON BOSONS          6 - PROTON BOSONS        ***
***              F*F (MAX) =  20.00                           ***
***              BINDING ENERGY =   0.6327 (MEV)              ***
*****************************************************************

 NO.    J  P          EXC (MEV)  EXPERIMENT    RATIO      F*F / MAX

  1     0  +  ( 1)      0.000      0.000        0.000        96.2
  2     2  +  ( 1)      0.563      0.550        1.000        96.1
  3     4  +  ( 1)      1.301      1.180        2.311        96.9
  4     0  +  ( 2)      1.420      1.426        2.523        97.0
  5     2  +  ( 2)      1.519      1.454        2.699        93.4
  6     2  +  ( 3)      1.635      1.664        2.904        64.8
  7     0  +  ( 3)      2.256                   4.009        56.6
  8     4  +  ( 2)      2.288                   4.065        57.7
  9     1  +  ( 1)      2.301                   4.088        58.0
 10     2  +  ( 4)      2.344                   4.165        63.6
 11     2  +  ( 5)      2.379                   4.227        87.3
 12     4  +  ( 3)      2.424                   4.306        97.3
 13     0  +  ( 4)      2.637                   4.685        96.8
 14     4  +  ( 4)      3.041                   5.402        37.9
 15     2  +  ( 6)      3.077                   5.467        39.8
```



```
 16     2  +  ( 7)      3.139                   5.576        59.1
 17     2  +  ( 8)      3.277                   5.822        69.7
```

```
*----------*
*  148     *
*      SM  *
*----------*

TRANSITION : E 2

DATE : 29-MAR-85      TIME : 10:10:00

     INPUT-FILE -->   DATE : 29-MAR-85      TIME : 10:08:57

EXPERIMENTAL  DATA     (# OF DATA =  8)

      INITIAL          FINAL          B(EL OR ML)       ERROR
       J   (#)         J   (#)
       0 ( 1)          2 ( 1)            0.7290         0.0300
       0 ( 1)          2 ( 2)            0.0450         0.0050
       0 ( 1)          2 ( 2)            0.0750         0.0100
       0 ( 1)          2 ( 3)            0.0300         0.0100
       4 ( 1)          2 ( 1)            0.2500         0.0700
       2 ( 2)          2 ( 1)            0.0890         0.0150
       2 ( 1)          2 ( 1)           -0.7300         0.3800   *
       2 ( 1)          2 ( 1)           -0.9700         0.2700   *

          DATA WITH * IS SUPPOSED TO BE MOMENT OR G-FACTOR

BOSON  TRANSITION  PARAMETERS

                      NEUTRON         PROTON

BOSON  CHARGE          0.057           0.128

CHI (DS / DD)         -0.800          -0.800       SAME  AS  IN  QQ-INT

*** CALCULATED  &  EXPERIMENTAL  E 2  MATRIX  ELEMENTS  (OR  B(EL OR ML)'S) ***

          * ON LAST COLUMN INDICATES MOMENT OR G-FACTOR  (M1 = G*L(TOT))
          @ ON LAST COLUMN INDICATES EXPERIMENTAL DATA

*****************************************************************************

 LI      LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON  PROTON   B(E2;LI->LF)

 0 (1)  2 (1)   -2.420    0.194   -5.339    0.235 *  -2.575  -5.527 *      0.7297
                                                        EXP DATA -->      0.7290 @
                                                            ( ERROR =     0.0300 )
 0 (1)  2 (2)    0.083   -0.349   -2.148   -0.528 *   0.362  -1.725 *      0.0401
                                                        EXP DATA -->      0.0450 @
                                                            ( ERROR =     0.0050 )
                                                        EXP DATA -->      0.0750 @
                                                            ( ERROR =     0.0100 )
 0 (1)  2 (3)   -1.912   -0.081    2.122   -0.183 *  -1.847   2.268 *      0.0342
                                                        EXP DATA -->      0.0300 @
                                                            ( ERROR =     0.0100 )

*****************************************************************************
```



```
 LI      LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON  PROTON   B(E2;LI->LF)

 2 (1)  2 (1)   -1.817    0.870   -4.047    1.328 *  -2.513  -5.109 *     -0.6042 *
                                                        EXP DATA -->     -0.7300 @
                                                            ( ERROR =     0.3800 )
                                                        EXP DATA -->     -0.9700 @
                                                            ( ERROR =     0.2700 )
 2 (1)  2 (2)    1.820   -0.060    5.760    0.848 *   1.869   5.081 *      0.1146
                                                        EXP DATA -->      0.0890 @
                                                            ( ERROR =     0.0150 )

*****************************************************************************

 LI      LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON  PROTON   B(E2;LI->LF)

 4 (1)  2 (1)    3.612   -0.448    9.397   -0.630 *   3.970   9.900 *      0.2479
                                                        EXP DATA -->      0.2500 @
                                                            ( ERROR =     0.0700 )
```

```
*----------*
*  148     *
*      SM  *
*----------*

TRANSITION : M 1

DATE : 29-MAR-85      TIME : 10:10:00

     INPUT-FILE -->   DATE : 29-MAR-85      TIME : 10:08:57


EXPERIMENTAL  DATA     (# OF DATA =  2)

      INITIAL         FINAL          B(EL OR ML)       ERROR
       J  (#)         J  (#)
       2 ( 1)         2 ( 1)        NO DATA (CALCULATED IN ILIST=0 MODE)
       0 ( 1)         1 ( 1)        NO DATA (CALCULATED IN ILIST=0 MODE)

          DATA WITH * IS SUPPOSED TO BE MOMENT OR G-FACTOR


BOSON  TRANSITION  PARAMETERS

                      NEUTRON         PROTON

BOSON  CHARGE          -0.350          0.850

   M 1  -->  THESE ARE BOSON G-FACTORS


*** CALCULATED  &  EXPERIMENTAL  M 1  MATRIX  ELEMENTS  (OR  B(EL OR ML)'S) ***

            * ON LAST COLUMN INDICATES MOMENT OR G-FACTOR  (M1 = G*L(TOT))
            @ ON LAST COLUMN INDICATES EXPERIMENTAL DATA

*******************************************************************************

 LI      LF       DS (N)  DD (N)   DS (P)  DD (P)  NEUTRON  PROTON   B(M1;LI->LF)

 2 (1)  2 (1)      0.000   0.656    0.000   1.076 *   0.379   0.621 *      0.3956 *

*******************************************************************************

 LI      LF       DS (N)  DD (N)   DS (P)  DD (P)  NEUTRON  PROTON   B(M1;LI->LF)

 0 (1)  1 (1)      0.000  -0.421    0.000   0.421 *  -0.650   0.650 *      0.6088
```



```
$N
ICMW    =            0,
IDBG    =            0,
NPSTW   =            0,
MATW    =            0,
NVEC1   =            0,
NCUT    =           80,
IWCF    =            1,
IWDDME  =            1,
ISYM    =            0,
TRVASM  =  0.2000000000000000    ,
NDRAC   =            8,
LAUTO   =            0,          2,          4,          1,          -6,
            1,          3,          -5,          -1, 7*0,
NEIGA   =            4,          8,          4,          1, 12*0,
NDUPTA  =  7*8,          7, 8*0,
IEX     =            1
$END
```

```
***********   N P B O S   C A L C U L A T I O N    (VERSION R)   ***********
*                                                                           *
*              VERSION   MAR  29  1985   //   LOS ALAMOS-TOKAI             *
*                                                                           *
*              DATE : 29-MAR-85    TIME : 10:08:57                         *
*                                                                           *
*****************************************************************************

 # CFP FILE (#11) READ-IN   REQUIRED MAX(ND) =11
          / MAX(ND) ON FILE =11 (IF FORMER > LATTER, LATTER BE TAKEN)

 **  D-D M.E.  INPUT  FROM  FILE-10  **
     MAXDD =     8     NDBST =   105     NMEDD =    1780     PRINT = 1

 *----------*
 *  148     *
 *     SM   *
 *----------*

   **  EXPERIMENTAL  SPECTRUM   (# OF DATA =   8 )
         SPIN           EXP. ENERGY (MEV)
          0 +    (1)        0.00000
          2 +    (1)        0.55000
          4 +    (1)        1.18000
          6 +    (1)        1.90600
          8 +    (1)        2.54500
          0 +    (2)        1.42600
          2 +    (2)        1.45400
          2 +    (3)        1.66400

***  PARAMETERS  IN  THE  HAMILTONIAN  ***

   RKAP : -0.140     HEX  :  0.000     EFIX :  0.000
   CHN  : -0.800     CHP  : -0.800
   RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
   ED   :  1.000     EDN  :  0.000     EDP  :  0.000
   MAJ  :  0.000     S-D  :  0.000     J=1 : 0.100     J=3 : 0.100
   RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 0
```



```
*****   P R O B L E M   *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  8
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  6
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  6

      TOTAL  ANGULAR  MOMENTUM  =  0

   NUM  OF  STATES  =   41

   # OF M.E. =     232     NON-ZERO / TRI-ANGLE = 26.9 (%)
   FILE ACCESS (#3) =     0 (/19.1KB)     LOGICAL =   0

        **  C-TIME  IN  BSYSME  :    0.3  (SEC)

*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

        EIG =   -0.62539   2.47859   4.69440   7.52767
        EIG =   -0.63142   2.11217   3.80579   5.79569
        EIG =   -0.63245   1.83098   3.09002   4.76078
        EIG =   -0.63265   1.55212   2.54675   3.95604
        EIG =   -0.63271   1.18058   2.13522   3.31167
        EIG =   -0.63273   0.90670   1.92189   2.88517
        EIG =   -0.63273   0.82625   1.84146   2.68351
        EIG =   -0.63273   0.80531   1.79930   2.51631
        EIG =   -0.63273   0.78943   1.67149   2.06675
        EIG =   -0.63273   0.78746   1.63334   2.01769

      ******  CONVERGED  AT  EIG(  1) =    -0.6327  ******

        EIG =   -0.63273   0.78721   1.62577   2.00826
        EIG =   -0.63273   0.78718   1.62434   2.00601
        EIG =   -0.63273   0.78718   1.62386   2.00497
        EIG =   -0.63273   0.78718   1.62374   2.00461
        EIG =   -0.63273   0.78718   1.62372   2.00453
        EIG =   -0.63273   0.78718   1.62372   2.00451

      ******  CONVERGED  AT  EIG(  2) =     0.7872  ******

        EIG =   -0.63273   0.78718   1.62371   2.00450
        EIG =   -0.63273   0.78718   1.62371   2.00449
        EIG =   -0.63273   0.78718   1.62371   2.00449
        EIG =   -0.63273   0.78718   1.62371   2.00449

      ******  CONVERGED  AT  EIG(  3) =     1.6237  ******

        EIG =   -0.63273   0.78718   1.62371   2.00449
        EIG =   -0.63273   0.78718   1.62371   2.00449

      ******  CONVERGED  AT  EIG(  4) =     2.0045  ******

***************************************************************************
***                                                                     ***
***   J =  0     DIM =   41     BE =  0.633                           ***
***                                                                     ***
```

JAERI-M 85-094

```
***   TRUNCATION  :  TOTAL =  8      NEUTRON =  2      PROTON =  6     ***
***                                                                    ***
      EIG       :    -0.633     0.787     1.624     2.004
***                                                                    ***
      EIG + BE  :     0.000     1.420     2.256     2.637
***                                                                    ***
************************************************************************
```

```
************************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
************************************************
        ND    0   1   2   3   4   5   6   7   8
 ST. #
------------------------------------------------
    1        69   0  27   1   2   0   0   0   0
    2        19   0  43  17  18   3   1   0   0
    3         2   0  76  11   9   1   1   0   0
    4         2   0  21  64   1  12   1   0   0
************************************************
```

```
************************************************************************************
          WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                              FIRST   10  AMPLITUDES  ARE  PRINTED
                              TOTAL  DIMENSION  =    41

ND(TOT)   0      2      2      2      3      3      3      4      4      4
ND (N)    0      2      1      0      2      1      0      2      2      2
L  (N)    0      0      2      0      2      2      0      0      2      4
ND (P)    0      0      1      2      1      2      3      2      2      2
L  (P)    0      0      2      0      2      2      0      0      2      4
------------------------------------------------------------------------------------
NO. 1   0.833  0.102  0.486  0.153 -0.061 -0.089 -0.023  0.050  0.070  0.105

NO. 2   0.435 -0.215 -0.316 -0.533  0.196  0.317  0.164 -0.130 -0.097 -0.177

NO. 3  -0.132  0.736  0.198 -0.422 -0.330 -0.019  0.070  0.009 -0.003  0.057

NO. 4   0.131 -0.120 -0.243 -0.368 -0.216 -0.487 -0.595  0.047 -0.068 -0.009
************************************************************************************
```

```
***  OVERLAPS  BETWEEN  EIGENSTATES  ***
        1          2          3          4
 1    1.0E+00 -2.3E-08 -1.0E-08 -4.2E-09
 2   -2.3E-08  1.0E+00  1.1E-08 -1.1E-08
 3   -1.0E-08  1.1E-08  1.0E+00 -2.8E-08
 4   -4.2E-09 -1.1E-08 -2.8E-08  1.0E+00
```

```
      **  C-TIME  IN  EIGLAN  :    2.7  (SEC)
```

```
***  MATRIX  ELEMENT  OF  F**2  ***
 ST#        1          2          3          4

   1     19.2480    -0.2034    -0.9348    -0.0652
   2     -0.2034    19.4045     0.7915    -0.2813
   3     -0.9348     0.7915    11.3228     0.2504
   4     -0.0652    -0.2813     0.2504    19.3510
```



```
*****  P R O B L E M  *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  8
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  6
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  6

      TOTAL  ANGULAR  MOMENTUM  =  2

   NUM  OF  STATES  =  105

   **  FILE-9  READ-IN : MAX(ND) = 6   MAX(LT) =  8   CALC.  DATE = 4-MAR-85

   # OF M.E. =    1577     NON-ZERO / TRI-ANGLE = 28.3 (%)
   FILE ACCESS (#3) =     0 (/19.1KB)     LOGICAL =   0

      **  C-TIME  IN  BSYSME  :    2.0  (SEC)
```

```
*****  DIAGONALIZATION  OF  HAMILTONIAN  *****

 EIG =   -0.06571   0.96191   1.96086   3.45287   4.82617   6.27912
           7.80095   8.85711
 EIG =   -0.06896   0.94011   1.77344   3.07593   4.30619   5.35512
           6.76100   8.08009
 EIG =   -0.06962   0.93129   1.67026   2.74410   3.82338   4.93810
           6.19964   7.38516
 EIG =   -0.06974   0.92801   1.60785   2.44125   3.40120   4.38936
           5.22977   6.47462
 EIG =   -0.06982   0.91855   1.23285   1.78747   2.85426   3.85976
           4.90788   5.97179
 EIG =   -0.06984   0.90341   1.05702   1.73555   2.78635   3.76939
           4.75972   5.41380
 EIG =   -0.06984   0.89072   1.01186   1.71940   2.71206   3.35646
           3.94636   4.90795
 EIG =   -0.06984   0.88691   1.00318   1.71360   2.59922   3.00770
           3.84735   4.84447
 EIG =   -0.06984   0.88638   1.00203   1.71230   2.53824   2.93342
           3.81487   4.63766
 EIG =   -0.06984   0.88630   1.00185   1.71196   2.50622   2.89702
           3.71444   3.99919
 EIG =   -0.06984   0.88628   1.00181   1.71185   2.48115   2.85632
           3.31674   3.85005

******  CONVERGED  AT  EIG(  1) =    -0.0698  ******

 EIG =   -0.06984   0.88628   1.00181   1.71181   2.45930   2.79413
           3.07578   3.81999
 EIG =   -0.06984   0.88628   1.00180   1.71179   2.42581   2.67518
           2.95306   3.71302
 EIG =   -0.06984   0.88628   1.00180   1.71178   2.29155   2.52665
           2.87898   3.29430
 EIG =   -0.06984   0.88628   1.00180   1.71175   1.90734   2.46945
           2.79829   3.04997
 EIG =   -0.06984   0.88628   1.00180   1.71169   1.79307   2.46060
           2.76884   3.00899
```

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```
 EIG =   -0.06984   0.88628   1.00180   1.71163   1.76086   2.45669
          2.75004   2.98464

******  CONVERGED  AT  EIG(  2) =      0.8863  ******

 EIG =   -0.06984   0.88628   1.00180   1.71158   1.75043   2.45387
          2.72807   2.94950
 EIG =   -0.06984   0.88628   1.00180   1.71157   1.74743   2.45171
          2.69792   2.89109

******  CONVERGED  AT  EIG(  3) =      1.0018  ******

 EIG =   -0.06984   0.88628   1.00180   1.71157   1.74671   2.45039
          2.66980   2.84811
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74651   2.44947
          2.64424   2.81913
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74645   2.44851
          2.61117   2.78808
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74643   2.44755
          2.57677   2.76023
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44659
          2.54756   2.73835
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44546
          2.52246   2.71888
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44482
          2.51194   2.70958

******  CONVERGED  AT  EIG(  4) =      1.7116  ******

 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44457
          2.50832   2.70567
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44450
          2.50732   2.70432
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44448
          2.50701   2.70380

******  CONVERGED  AT  EIG(  5) =      1.7464  ******

 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44446
          2.50673   2.70308
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44445
          2.50635   2.69955
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50600   2.66402
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50589   2.64657
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50587   2.64255
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50589   2.64623
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64499
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64477
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64471
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64469

******  CONVERGED  AT  EIG(  6) =      2.4444  ******

 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
```



```
          2.50588   2.64468
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467

******  CONVERGED  AT  EIG(  7) =      2.5059  ******

 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467
 EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
          2.50588   2.64467

******  CONVERGED  AT  EIG(  8) =      2.6447  ******

*************************************************************************
***                                                                   ***
***   J =  2     DIM =  105     BE =  0.633                           ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6     ***
***                                                                   ***
      EIG       :    -0.070    0.886    1.002    1.712    1.746    2.444
                      2.506    2.645
***                                                                   ***
      EIG + BE  :     0.563    1.519    1.635    2.344    2.379    3.077
                      3.139    3.277
***                                                                   ***
*************************************************************************
```

****
PROBABILITY (%) IN VARIOUS D-CONFIGURATIONS
****

ST. # \ ND	0	1	2	3	4	5	6	7	8
1	0	69	9	20	2	1	0	0	0
2	0	18	65	4	12	1	0	0	0
3	0	68	7	19	4	2	0	0	0
4	0	5	68	12	10	4	1	0	0
5	0	13	20	43	12	10	1	0	0
6	0	1	73	9	15	1	1	0	0
7	0	4	0	75	13	8	1	0	0
8	0	1	15	46	27	7	3	0	0

****

```
*************************************************************************
         WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                             FIRST   10  AMPLITUDES  ARE  PRINTED
                             TOTAL  DIMENSION  =   105

ND(TOT)   1      1      2      2      2      3      3      3      3      3
ND (N)    1      0      2      1      0      2      2      2      1      1
L  (N)    2      0      2      2      0      0      2      4      2      2
ND (P)    0      1      0      1      2      1      1      1      2      2
L  (P)    0      2      0      2      2      2      2      2      0      2
-------------------------------------------------------------------------
```

```
NO. 1  -0.534 -0.633  0.083  0.248  0.129 -0.121 -0.118 -0.173 -0.159 -0.176

NO. 2   0.046 -0.422 -0.247 -0.527 -0.555  0.031  0.026  0.071  0.057 -0.158

NO. 3  -0.746  0.356 -0.020 -0.092 -0.241  0.002 -0.140 -0.198  0.107  0.156

NO. 4   0.144 -0.157  0.686  0.336 -0.317 -0.066  0.163  0.002  0.167 -0.005

NO. 5   0.036  0.359  0.283 -0.044 -0.338 -0.224 -0.055 -0.212 -0.291 -0.200

NO. 6   0.091  0.039 -0.490  0.593 -0.376  0.108 -0.172  0.110 -0.100  0.150

NO. 7  -0.095  0.171  0.013 -0.030  0.030 -0.384 -0.155  0.323  0.406  0.175

NO. 8  -0.065  0.085 -0.267  0.206  0.194 -0.080  0.355 -0.050  0.247 -0.477
*******************************************************************************
```

*** OVERLAPS BETWEEN EIGENSTATES ***

	1	2	3	4	5	6	7	8
1	1.0E+00	4.3E-09	2.5E-09	-1.7E-09	-7.2E-09	-2.1E-09	1.4E-10	-3.4E-10
2	4.3E-09	1.0E+00	-2.2E-08	1.6E-09	-2.8E-08	-1.2E-08	-5.1E-08	-1.0E-06
3	2.5E-09	-2.2E-08	1.0E+00	-1.5E-09	-3.2E-08	-6.3E-09	-6.1E-09	-1.2E-07
4	-1.7E-09	1.6E-09	-1.5E-09	1.0E+00	6.4E-07	9.5E-09	7.7E-10	4.7E-09
5	-7.2E-09	-2.8E-08	-3.2E-08	6.4E-07	1.0E+00	-1.2E-08	5.9E-09	-2.8E-09
6	-2.1E-09	-1.2E-08	-6.3E-09	9.5E-09	-1.2E-08	1.0E+00	2.6E-08	-1.3E-09
7	1.4E-10	-5.1E-08	-6.1E-09	7.7E-10	5.9E-09	2.6E-08	1.0E+00	-1.9E-09
8	-3.4E-10	-1.0E-06	-1.2E-07	4.7E-09	-2.8E-09	-1.3E-09	-1.9E-09	1.0E+00

```
      ** C-TIME IN EIGLAN :   17.3  (SEC)
```

*** MATRIX ELEMENT OF F**2 ***

ST#	1	2	3	4	5	6
	7	8				
1	19.2206	0.3093	-1.1840	-0.4667	-0.2751	-0.5564
	-0.5877	-0.1709				
2	0.3093	18.6796	2.1422	0.2092	0.7735	-0.6485
	0.0785	-0.7976				
3	-1.1840	2.1422	12.9649	1.0318	-1.7715	-0.1953
	-0.0398	-0.0355				
4	-0.4667	0.2092	1.0318	12.7287	-2.9273	1.6188
	0.0348	1.3266				
5	-0.2751	0.7735	-1.7715	-2.9273	17.4558	1.1353
	0.4079	0.4175				
6	-0.5564	-0.6485	-0.1953	1.6188	1.1353	7.9515
	0.2238	-1.1223				
7	-0.5877	0.0785	-0.0398	0.0348	0.4079	0.2238
	11.8199	0.9286				
8	-0.1709	-0.7976	-0.0355	1.3266	0.4175	-1.1223
	0.9286	13.9474				


```
*****   P R O B L E M   *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  8
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  6
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  6

      TOTAL  ANGULAR  MOMENTUM  =  4


   NUM  OF  STATES  =  124

   # OF M.E. =    2421      NON-ZERO / TRI-ANGLE = 31.2 (%)
   FILE ACCESS (#3) =     0 (/19.1KB)      LOGICAL =   0

      ** C-TIME IN BSYSME :    2.8  (SEC)


*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

      EIG =    0.81531   2.83161   5.00683   7.83053
      EIG =    0.71377   2.28353   4.10432   6.17377
      EIG =    0.68046   1.99219   3.50525   5.07604
      EIG =    0.67070   1.83271   3.03823   4.36672
      EIG =    0.66849   1.76062   2.76055   3.94966
      EIG =    0.66816   1.74046   2.65352   3.73649
      EIG =    0.66812   1.73479   2.59529   3.45757
      EIG =    0.66809   1.71913   2.07032   2.72081
      EIG =    0.66808   1.70115   1.89756   2.69141
      EIG =    0.66808   1.68079   1.83099   2.67071
      EIG =    0.66808   1.66557   1.80468   2.62881
      EIG =    0.66808   1.65779   1.79430   2.52585
      EIG =    0.66808   1.65595   1.79192   2.47104
      EIG =    0.66808   1.65548   1.79126   2.44474
      EIG =    0.66808   1.65535   1.79106   2.42915
      EIG =    0.66808   1.65532   1.79100   2.41872

   ******  CONVERGED  AT  EIG(  1) =     0.6681  ******

      EIG =    0.66808   1.65531   1.79098   2.41509
      EIG =    0.66808   1.65531   1.79098   2.41294
      EIG =    0.66808   1.65531   1.79098   2.41163
      EIG =    0.66808   1.65531   1.79098   2.41009
      EIG =    0.66808   1.65531   1.79098   2.40875
      EIG =    0.66808   1.65531   1.79098   2.40836
      EIG =    0.66808   1.65531   1.79098   2.40820
      EIG =    0.66808   1.65531   1.79098   2.40814

   ******  CONVERGED  AT  EIG(  2) =     1.6553  ******

      EIG =    0.66808   1.65531   1.79098   2.40811
      EIG =    0.66808   1.65531   1.79098   2.40810

   ******  CONVERGED  AT  EIG(  3) =     1.7910  ******

      EIG =    0.66808   1.65531   1.79098   2.40809
      EIG =    0.66808   1.65531   1.79098   2.40808
      EIG =    0.66808   1.65531   1.79098   2.40808
```

```
 EIG =    0.66808   1.65531   1.79098   2.40808
 EIG =    0.66808   1.65531   1.79098   2.40808
 EIG =    0.66808   1.65531   1.79098   2.40808
 EIG =    0.66808   1.65531   1.79098   2.40808
 EIG =    0.66808   1.65531   1.79098   2.40808
 EIG =    0.66808   1.65531   1.79098   2.40808

      ****** CONVERGED AT EIG( 4) =     2.4081 ******

*************************************************************************
***                                                                   ***
***   J =  4     DIM =  124     BE =  0.633                          ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6     ***
***                                                                   ***
      EIG       :    0.668    1.655    1.791    2.408
***                                                                   ***
      EIG + BE  :    1.301    2.288    2.424    3.041
***                                                                   ***
*************************************************************************

   ************************************************
    PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
   ************************************************
          ND    0   1   2   3   4   5   6   7   8
    ST. #
   ------------------------------------------------
       1        0   0  71  12  15   2   0   0   0
       2        0   0  79   8  11   1   1   0   0
       3        0   0  15  65   8  11   1   0   0
       4        0   0  78   6  15   1   1   0   0
   ************************************************

   ***************************************************************************
            WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                                FIRST   10  AMPLITUDES  ARE  PRINTED
                                TOTAL  DIMENSION  =   124

   ND(TOT)   2      2      2      3      3      3      3      3      4      4
   ND (N)    2      1      0      2      2      1      1      0      2      2
   L  (N)    4      2      0      2      4      2      2      0      0      2
   ND (P)    0      1      2      1      1      2      2      3      2      2
   L  (P)    0      2      4      2      2      2      4      4      4      2
   ---------------------------------------------------------------------------
   NO. 1  -0.268 -0.584 -0.543  0.114  0.137  0.154  0.228  0.127 -0.123 -0.059

   NO. 2   0.701  0.263 -0.480 -0.087 -0.245 -0.034  0.058  0.085 -0.025  0.021

   NO. 3  -0.068 -0.261 -0.269 -0.177 -0.206 -0.449 -0.295 -0.536  0.024  0.064

   NO. 4  -0.544  0.588 -0.371 -0.057  0.175  0.017 -0.154 -0.043  0.075  0.033
   ***************************************************************************

   ***  OVERLAPS  BETWEEN  EIGENSTATES  ***
          1         2         3         4
    1   1.0E+00 -1.1E-09  2.2E-10 -1.0E-06
    2  -1.1E-09  1.0E+00  3.8E-09 -3.7E-10
    3   2.2E-10  3.8E-09  1.0E+00  1.6E-10
    4  -1.0E-06 -3.7E-10  1.6E-10  1.0E+00

         **  C-TIME  IN  EIGLAN  :    8.8  (SEC)
```



```
***  MATRIX  ELEMENT  OF  F**2  ***
 ST#        1          2          3          4

   1     19.3808     1.1687    -0.1478    -0.3442
   2      1.1687    11.5410    -0.1550     1.9069
   3     -0.1478    -0.1550    19.4510     0.3357
   4     -0.3442     1.9069     0.3357     7.5848
```

```
*****   P R O B L E M   *****

       UPPER  LIMIT  OF  TOTAL     D-BOSON  #  =  8
       .....  .....  ..  NEUTRON   .......  .  =  2
       .....  .....  ..  PROTON    .......  .  =  6
       TOTAL  NEUTRON  BOSON  #  =  2
       .....  PROTON   .....  .  =  6

       TOTAL  ANGULAR  MOMENTUM  =  1

    NUM  OF  STATES  =   39

    # OF M.E. =      320      NON-ZERO / TRI-ANGLE = 41.0 (%)
    FILE ACCESS (#3) =      0 (/19.1KB)      LOGICAL =   0

         **  C-TIME  IN  BSYSME  :    0.6  (SEC)

*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

         EIG =     2.87423
         EIG =     2.14989
         EIG =     1.85104
         EIG =     1.71504
         EIG =     1.67899
         EIG =     1.67078
         EIG =     1.66858
         EIG =     1.66822
         EIG =     1.66820
         EIG =     1.66820
         EIG =     1.66820
         EIG =     1.66820
         EIG =     1.66820
         EIG =     1.66820

       ******  CONVERGED  AT  EIG(  1) =      1.6682  ******

**************************************************************************
***                                                                    ***
***   J =  1      DIM =   39      BE =  0.633                          ***
***                                                                    ***
***   TRUNCATION  :  TOTAL =  8      NEUTRON =  2      PROTON =  6     ***
***                                                                    ***
      EIG       :     1.668
***
      EIG + BE  :     2.301                                            ***
***                                                                    ***
**************************************************************************

   ************************************************
    PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
   ************************************************
          ND     0   1   2   3   4   5   6   7   8
    ST. #
   ------------------------------------------------
      1          0   0  79   6  14   1   0   0   0
   ************************************************
```



```
**************************************************************************************
          WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                              FIRST   10  AMPLITUDES  ARE  PRINTED
                              TOTAL  DIMENSION  =     39

 ND(TOT)   2      3      3      4      4      4      4      5      5      5
 ND (N)    1      2      1      2      2      1      1      2      2      2
 L  (N)    2      2      2      2      4      2      2      2      2      4
 ND (P)    1      1      2      2      2      3      3      3      3      3
 L  (P)    2      2      2      2      4      2      3      2      3      3
--------------------------------------------------------------------------------------
 NO. 1  -0.892  0.139  0.204 -0.121 -0.339 -0.077  0.016  0.025 -0.012  0.010
**************************************************************************************

       **  C-TIME  IN  EIGLAN  :    0.7  (SEC)

   ***  MATRIX  ELEMENT  OF  F**2  ***
    ST#         1

      1      11.5930

CPU-TIME :       46 (SEC)        FINISHED AT 10:09:54
```

NPBOS VERSION : MAR-85 / LOS ALAMOS-TOKAI / TAKA OTSUKA

```
*****************************************************************
***      2 - NEUTRON BOSONS          6 - PROTON BOSONS        ***
***              F*F (MAX) =  20.00                           ***
***              BINDING ENERGY =   0.6327 (MEV)              ***
*****************************************************************
```

NO.	J	P		EXC (MEV)	EXPERIMENT	RATIO	F*F / MAX
1	0	+	(1)	0.000	0.000	0.000	96.2
2	2	+	(1)	0.563	0.550	1.000	96.1
3	4	+	(1)	1.301	1.180	2.311	96.9
4	0	+	(2)	1.420	1.426	2.523	97.0
5	2	+	(2)	1.519	1.454	2.699	93.4
6	2	+	(3)	1.635	1.664	2.904	64.8
7	0	+	(3)	2.256		4.009	56.6
8	4	+	(2)	2.288		4.065	57.7
9	1	+	(1)	2.301		4.088	58.0
10	2	+	(4)	2.344		4.165	63.6
11	2	+	(5)	2.379		4.227	87.3
12	4	+	(3)	2.424		4.306	97.3
13	0	+	(4)	2.637		4.685	96.8
14	4	+	(4)	3.041		5.402	37.9
15	2	+	(6)	3.077		5.467	39.8
16	2	+	(7)	3.139		5.576	59.1
17	2	+	(8)	3.277		5.822	69.7


```
$N
ICMW   =          0,
IDBG   =          0,
NPSTW  =          0,
MATW   =          0,
NVEC1  =          0,
NCUT   =         80,
IWCF   =          0,
IWDDME =          1,
ISYM   =          0,
TRVASM = 0.2000000000000000    ,
NDRAC  =          8,
LAUTO  =          0,          2,          4,          1,          -6,
          1,          3,          -5,          -1, 7*0,
NEIGA  =          4,          6,          4,          1, 12*0,
NDUPTA = 7*8,          7, 8*0,
IEX    =          1
$END
```

JAERI-M 85-094

```
**********   N P B O S   C A L C U L A T I O N    (VERSION R)   **********
*                                                                          *
*              VERSION   MAR 29 1985  //  LOS ALAMOS-TOKAI                *
*                                                                          *
*              DATE : 29-MAR-85    TIME : 10:12:20                         *
*                                                                          *
****************************************************************************

 # CFP FILE (#11) READ-IN   REQUIRED MAX(ND) =11
          / MAX(ND) ON FILE =11 (IF FORMER > LATTER, LATTER BE TAKEN)

 **  D-D M.E.  INPUT  FROM  FILE-10  **
     MAXDD =     8     NDBST =   105     NMEDD =    1780     PRINT = 1

   *----------*
   *  148     *
   *     SM   *
   *----------*

    **  EXPERIMENTAL  SPECTRUM   (# OF DATA =   8 )
          SPIN            EXP. ENERGY (MEV)
           0 +    (1)        0.00000
           2 +    (1)        0.55000
           4 +    (1)        1.18000
           6 +    (1)        1.90600
           8 +    (1)        2.54500
           0 +    (2)        1.42600
           2 +    (2)        1.45400
           2 +    (3)        1.66400

 ***  PARAMETERS  IN  THE  HAMILTONIAN  ***

    RKAP : -0.140     HEX  :  0.000     EFIX :  0.000
    CHN  : -0.800     CHP  : -0.800
    RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
    ED   :  1.000     EDN  :  0.000     EDP  :  0.000
    MAJ  :  0.000     S-D  :  0.000     J=1 : 0.100      J=3 : 0.100
    RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 0

     # OF M.E. =      232     NON-ZERO / TRI-ANGLE = 26.9 (%)
     FILE ACCESS (#3) =      0 (/19.1KB)     LOGICAL =   0
*****************************************************************
***                                                           ***
***   J =  0     DIM =   41     BE =  0.633                   ***
***                                                           ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6   ***
***                                                           ***
      EIG       :   -0.633    0.787    1.624    2.004
***                                                           ***
      EIG + BE  :    0.000    1.420    2.256    2.637
***                                                           ***
*****************************************************************
```



```
*************************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
*************************************************
       ND   0   1   2   3   4   5   6   7   8
 ST. #
-------------------------------------------------
    1      69   0  27   1   2   0   0   0   0
    2      19   0  43  17  18   3   1   0   0
    3       2   0  76  11   9   1   1   0   0
    4       2   0  21  64   1  12   1   0   0
*************************************************

 ***  MATRIX  ELEMENT  OF  F**2  ***
  ST#        1          2          3          4

    1     19.2480    -0.2034    -0.9348    -0.0652
    2     -0.2034    19.4045     0.7915    -0.2813
    3     -0.9348     0.7915    11.3228     0.2504
    4     -0.0652    -0.2813     0.2504    19.3510

 **  FILE-9  READ-IN : MAX(ND) = 6   MAX(LT) =  8   CALC.  DATE = 4-MAR-85

 # OF M.E. =     1577     NON-ZERO / TRI-ANGLE = 28.3 (%)
 FILE ACCESS (#3) =      0 (/19.1KB)     LOGICAL =   0
*****************************************************************************
***                                                                       ***
***   J =  2     DIM =  105     BE =  0.633                               ***
***                                                                       ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6          ***
***                                                                       ***
      EIG       :   -0.070    0.886    1.002    1.712    1.746    2.444
***                                                                       ***
      EIG + BE  :    0.563    1.519    1.635    2.344    2.379    3.077
***                                                                       ***
*****************************************************************************

*************************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
*************************************************
       ND   0   1   2   3   4   5   6   7   8
 ST. #
-------------------------------------------------
    1       0  69   9  20   2   1   0   0   0
    2       0  18  65   4  12   1   0   0   0
    3       0  68   7  19   4   2   0   0   0
    4       0   5  68  12  10   4   1   0   0
    5       0  13  20  43  12  10   1   0   0
    6       0   1  73   9  15   1   1   0   0
*************************************************

 ***  MATRIX  ELEMENT  OF  F**2  ***
  ST#        1          2          3          4          5          6

    1     19.2206     0.3093     1.1840     0.4667     0.2751     0.5563
    2      0.3093    18.6796    -2.1422    -0.2092    -0.7735     0.6485
    3      1.1840    -2.1422    12.9649     1.0318    -1.7715    -0.1953
    4      0.4667    -0.2092     1.0318    12.7287    -2.9273     1.6188
    5      0.2751    -0.7735    -1.7715    -2.9273    17.4558     1.1353
    6      0.5563     0.6485    -0.1953     1.6188     1.1353     7.9515
```

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```
     # OF M.E. =    2421      NON-ZERO / TRI-ANGLE = 31.2 (%)
     FILE ACCESS (#3) =      0 (/19.1KB)      LOGICAL =    0
*************************************************************************
***                                                                   ***
***   J =  4      DIM =  124      BE =  0.633                         ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  8      NEUTRON =  2      PROTON =  6     ***
***                                                                   ***
      EIG       :    0.668     1.655     1.791     2.408
***                                                                   ***
      EIG + BE  :    1.301     2.288     2.424     3.041
***                                                                   ***
*************************************************************************

   ************************************************
    PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
   ************************************************
          ND    0   1   2   3   4   5   6   7   8
    ST. #
   ------------------------------------------------
       1        0   0  71  12  15   2   0   0   0
       2        0   0  79   8  11   1   1   0   0
       3        0   0  15  65   8  11   1   0   0
       4        0   0  78   6  15   1   1   0   0
   ************************************************


     ***  MATRIX  ELEMENT  OF  F**2  ***
      ST#         1          2          3          4

        1     19.3808     1.1687    -0.1478    -0.3442
        2      1.1687    11.5410    -0.1550     1.9069
        3     -0.1478    -0.1550    19.4510     0.3357
        4     -0.3442     1.9069     0.3357     7.5848

     # OF M.E. =     320      NON-ZERO / TRI-ANGLE = 41.0 (%)
     FILE ACCESS (#3) =      0 (/19.1KB)      LOGICAL =    0
*************************************************************************
***                                                                   ***
***   J =  1      DIM =   39      BE =  0.633                         ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  8      NEUTRON =  2      PROTON =  6     ***
***                                                                   ***
      EIG       :    1.668
***                                                                   ***
      EIG + BE  :    2.301
***                                                                   ***
*************************************************************************

   ************************************************
    PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
   ************************************************
          ND    0   1   2   3   4   5   6   7   8
    ST. #
   ------------------------------------------------
       1        0   0  79   6  14   1   0   0   0
   ************************************************


     ***  MATRIX  ELEMENT  OF  F**2  ***
      ST#         1
```



```
        1     11.5930

CPU-TIME :       36 (SEC)        FINISHED AT 10:13:01
```

NPBOS VERSION : MAR-85 / LOS ALAMOS-TOKAI / TAKA OTSUKA

```
*****************************************************************
***      2 - NEUTRON BOSONS          6 - PROTON BOSONS        ***
***              F*F (MAX) =  20.00                           ***
***              BINDING ENERGY =   0.6327 (MEV)              ***
*****************************************************************
```

NO.	J	P		EXC (MEV)	EXPERIMENT	RATIO	F*F / MAX
1	0	+	(1)	0.000	0.000	0.000	96.2
2	2	+	(1)	0.563	0.550	1.000	96.1
3	4	+	(1)	1.301	1.180	2.311	96.9
4	0	+	(2)	1.420	1.426	2.523	97.0
5	2	+	(2)	1.519	1.454	2.699	93.4
6	2	+	(3)	1.635	1.664	2.904	64.8
7	0	+	(3)	2.256		4.009	56.6
8	4	+	(2)	2.288		4.065	57.7
9	1	+	(1)	2.301		4.088	58.0
10	2	+	(4)	2.344		4.165	63.6
11	2	+	(5)	2.379		4.227	87.3
12	4	+	(3)	2.424		4.306	97.3
13	0	+	(4)	2.637		4.685	96.8
14	4	+	(4)	3.041		5.402	37.9
15	2	+	(6)	3.077		5.467	39.8


```
$N
ICMW   =          0,
IDBG   =          0,
NPSTW  =          0,
MATW   =          0,
NVEC1  =          0,
NCUT   =         80,
IWCF   =          2,
IWDDME =          1,
ISYM   =          0,
TRVASM =  0.2000000000000000    ,
NDRAC  =          8,
LAUTO  =          0,          2,         -4,          1,         -6,
          1,          3,         -5,         -1, 7*0,
NEIGA  =          4,         20,          4,          1, 12*0,
NDUPTA = 7*8,          7, 8*0,
IEX    =          2
$END
```

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```
**********   N P B O S   C A L C U L A T I O N    (VERSION R)   **********
*                                                                          *
*              VERSION   MAR  29  1985   //   LOS ALAMOS-TOKAI            *
*                                                                          *
*              DATE : 15-MAY-85    TIME : 11:21:06                         *
*                                                                          *
****************************************************************************

 # CFP FILE (#11) READ-IN   REQUIRED MAX(ND) =11
          / MAX(ND) ON FILE =11 (IF FORMER > LATTER, LATTER BE TAKEN)

 **  D-D M.E.  INPUT  FROM  FILE-10  **
     MAXDD =     8     NDBST =   105     NMEDD =    1780     PRINT = 1

  *----------*
  *  148     *
  *     SM   *
  *----------*

   **  EXPERIMENTAL  SPECTRUM   (# OF DATA =   8 )
         SPIN            EXP. ENERGY (MEV)
          0 +    (1)        0.00000
          2 +    (1)        0.55000
          4 +    (1)        1.18000
          6 +    (1)        1.90600
          8 +    (1)        2.54500
          0 +    (2)        1.42600
          2 +    (2)        1.45400
          2 +    (3)        1.66400

***  PARAMETERS  IN  THE  HAMILTONIAN  ***

   RKAP : -0.140     HEX  :  0.000     EFIX :  0.000
   CHN  : -0.800     CHP  : -0.800
   RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
   ED   :  1.000     EDN  :  0.000     EDP  :  0.000
   MAJ  :  0.000     S-D  :  0.000     J=1 : 0.100     J=3 : 0.100
   RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 0
```



```
*****   P R O B L E M   *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  8
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  6
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  6

      TOTAL  ANGULAR  MOMENTUM  =  0

   NUM  OF  STATES  =   41

   # OF M.E. =     232     NON-ZERO / TRI-ANGLE = 26.9 (%)
   FILE ACCESS (#3) =     0 (/19.1KB)     LOGICAL =   0

        **  C-TIME  IN  BSYSME  :    0.3  (SEC)

*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

   N =  1  A =    1.339  B =  2.211  B2= 0.49E+01
   N =  2  A =    2.626  B =  1.879  B2= 0.35E+01
   N =  3  A =    4.694  B =  2.042  B2= 0.42E+01
   N =  4  A =    5.417  B =  2.007  B2= 0.40E+01

        EIG =   -0.62539   2.47859   4.69440   7.52767

   N =  5  A =    5.245  B =  2.044  B2= 0.42E+01

        EIG =   -0.63142   2.11217   3.80579   5.79569

   N =  6  A =    4.953  B =  1.988  B2= 0.40E+01

        EIG =   -0.63245   1.83098   3.09002   4.76078

   N =  7  A =    4.424  B =  2.178  B2= 0.47E+01

        EIG =   -0.63265   1.55212   2.54675   3.95604

   N =  8  A =    4.356  B =  1.976  B2= 0.39E+01

        EIG =   -0.63271   1.18058   2.13522   3.31167

   N =  9  A =    4.269  B =  1.742  B2= 0.30E+01

        EIG =   -0.63273   0.90670   1.92189   2.88517

   N = 10  A =    5.598  B =  1.783  B2= 0.32E+01

        EIG =   -0.63273   0.82625   1.84146   2.68351

   N = 11  A =    4.667  B =  2.562  B2= 0.66E+01

        EIG =   -0.63273   0.80531   1.79930   2.51631

   N = 12  A =    5.646  B =  1.376  B2= 0.19E+01

        EIG =   -0.63273   0.78943   1.67149   2.06675
```

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```
N = 13  A =    6.888  B =  1.687  B2= 0.28E+01
      EIG =   -0.63273   0.78746   1.63334   2.01769

    ******  CONVERGED  AT  EIG(  1) =    -0.6327  ******
N = 14  A =    5.496  B =  1.503  B2= 0.23E+01
      EIG =   -0.63273   0.78721   1.62577   2.00826
N = 15  A =    5.972  B =  1.934  B2= 0.37E+01
      EIG =   -0.63273   0.78718   1.62434   2.00601
N = 16  A =    5.704  B =  1.679  B2= 0.28E+01
      EIG =   -0.63273   0.78718   1.62386   2.00497
N = 17  A =    6.326  B =  1.563  B2= 0.24E+01
      EIG =   -0.63273   0.78718   1.62374   2.00461
N = 18  A =    6.016  B =  1.396  B2= 0.19E+01
      EIG =   -0.63273   0.78718   1.62372   2.00453
N = 19  A =    5.593  B =  2.007  B2= 0.40E+01
      EIG =   -0.63273   0.78718   1.62372   2.00451

    ******  CONVERGED  AT  EIG(  2) =     0.7872  ******
N = 20  A =    4.609  B =  1.218  B2= 0.15E+01
      EIG =   -0.63273   0.78718   1.62371   2.00450
N = 21  A =    6.283  B =  1.178  B2= 0.14E+01
      EIG =   -0.63273   0.78718   1.62371   2.00449
N = 22  A =    5.630  B =  1.257  B2= 0.16E+01
      EIG =   -0.63273   0.78718   1.62371   2.00449
N = 23  A =    6.149  B =  1.107  B2= 0.12E+01
      EIG =   -0.63273   0.78718   1.62371   2.00449

    ******  CONVERGED  AT  EIG(  3) =     1.6237  ******
N = 24  A =    6.242  B =  1.501  B2= 0.23E+01
      EIG =   -0.63273   0.78718   1.62371   2.00449
N = 25  A =    5.971  B =  1.152  B2= 0.13E+01
      EIG =   -0.63273   0.78718   1.62371   2.00449
```



```
    ******  CONVERGED  AT  EIG(  4) =     2.0045  ******

*************************************************************************
***                                                                   ***
***   J =  0     DIM =   41     BE =  0.633                           ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6      ***
***                                                                   ***
      EIG      :   -0.633    0.787    1.624    2.004
***                                                                   ***
      EIG + BE :    0.000    1.420    2.256    2.637
***                                                                   ***
*************************************************************************

    ********  AMPLITUDE  IN  THE  LANCZOS  BASIS  ********

   --- NO. 1 ---
    0.71482 -0.63742  0.26438 -0.10307  0.04166 -0.01863  0.00950 -0.00506
    0.00230 -0.00073  0.00031 -0.00013  0.00003 -0.00001  0.00000  0.00000
    0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
    0.00000

   --- NO. 2 ---
   -0.05804  0.01448  0.05412 -0.11687  0.21455 -0.35316  0.51938 -0.54499
    0.41184 -0.20502  0.15084 -0.08570  0.02175 -0.00877  0.00305 -0.00135
    0.00045 -0.00015  0.00006 -0.00003  0.00001  0.00000  0.00000  0.00000
    0.00000

   --- NO. 3 ---
    0.16238  0.02092 -0.20223  0.28478 -0.33250  0.30951 -0.17639 -0.05575
    0.27145 -0.34904  0.51277 -0.36605  0.11532 -0.06127  0.02841 -0.01626
    0.00679 -0.00295  0.00169 -0.00128  0.00037 -0.00012  0.00004 -0.00001
    0.00000

   --- NO. 4 ---
   -0.29558 -0.08898  0.37724 -0.41491  0.32165 -0.10263 -0.17852  0.29206
   -0.15078 -0.13530  0.41990 -0.34214  0.12363 -0.07882  0.04432 -0.02967
    0.01431 -0.00768  0.00605 -0.00547  0.00173 -0.00064  0.00021 -0.00006
    0.00002

*************************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
*************************************************
       ND    0   1   2   3   4   5   6   7   8
 ST. #
-------------------------------------------------
    1        69   0  27   1   2   0   0   0   0
    2        19   0  43  17  18   3   1   0   0
    3         2   0  76  11   9   1   1   0   0
    4         2   0  21  64   1  12   1   0   0
*************************************************

*************************************************************************
          WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                              FIRST   41  AMPLITUDES  ARE  PRINTED
                              TOTAL  DIMENSION  =    41

ND(TOT)   0      2      2      2      3      3      3      4      4      4
ND (N)    0      2      1      0      2      1      0      2      2      2
L  (N)    0      0      2      0      2      2      0      0      2      4
```

ND (P)	0	0	1	2	1	2	3	2	2	2
L (P)	0	0	2	0	2	2	0	0	2	4
NO. 1	0.833	0.102	0.486	0.153	-0.061	-0.089	-0.023	0.050	0.070	0.105
	0.067	0.012	-0.012	-0.016	-0.024	-0.010	-0.007	-0.002	0.005	0.006
	0.002	0.010	-0.002	0.003	-0.001	0.000	0.000	-0.001	-0.001	0.001
	-0.002	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000									
NO. 2	0.435	-0.215	-0.316	-0.533	0.196	0.317	0.164	-0.130	-0.097	-0.177
	-0.332	-0.092	0.052	0.080	0.102	0.077	0.058	0.018	-0.035	-0.042
	-0.012	-0.064	0.011	-0.032	0.007	-0.003	0.001	0.008	0.009	-0.005
	0.014	0.006	0.004	0.003	-0.002	0.000	-0.002	-0.001	-0.003	0.001
	0.001									
NO. 3	-0.132	0.736	0.198	-0.422	-0.330	-0.019	0.070	0.009	-0.003	0.057
	-0.276	-0.110	0.017	0.033	0.021	0.070	0.036	0.020	-0.034	-0.041
	-0.008	-0.062	0.006	-0.043	0.007	-0.006	0.001	0.009	0.011	-0.004
	0.016	0.005	0.005	0.004	-0.002	0.001	-0.003	-0.001	-0.004	0.001
	0.001									
NO. 4	0.131	-0.120	-0.243	-0.368	-0.216	-0.487	-0.595	0.047	-0.068	-0.009
	0.000	0.051	-0.091	-0.096	-0.144	-0.139	-0.237	-0.061	0.023	0.019
	0.033	0.033	-0.021	0.037	-0.033	0.006	-0.005	-0.021	-0.016	0.025
	-0.029	-0.030	-0.009	-0.013	0.003	-0.003	0.003	0.003	0.005	-0.002
	-0.004									

****

*** OVERLAPS BETWEEN EIGENSTATES ***

	1	2	3	4
1	1.0E+00	-2.3E-08	-1.0E-08	-4.2E-09
2	-2.3E-08	1.0E+00	1.1E-08	-1.1E-08
3	-1.0E-08	1.1E-08	1.0E+00	-2.8E-08
4	-4.2E-09	-1.1E-08	-2.8E-08	1.0E+00

** C-TIME IN EIGLAN : 3.0 (SEC)

*** MATRIX ELEMENT OF F**2 ***

ST#	1	2	3	4
1	19.2480	-0.2034	-0.9348	-0.0652
2	-0.2034	19.4045	0.7915	-0.2813
3	-0.9348	0.7915	11.3228	0.2504
4	-0.0652	-0.2813	0.2504	19.3510

*** MATRIX ELEMENT OF ND ***

ST#		1	2	3	4
1	N	0.3161	-0.3477	0.2767	-0.0634
	P	0.3590	-0.5534	-0.0745	-0.0600
2	N	-0.3477	0.6608	-0.4096	-0.1970
	P	-0.5534	1.6027	0.7243	-0.4035
3	N	0.2767	-0.4096	1.4506	-0.1193
	P	-0.0745	0.7243	0.8740	0.0711
4	N	-0.0634	-0.1970	-0.1193	0.5995
	P	-0.0600	-0.4035	0.0711	2.4154

*** MATRIX ELEMENT OF (Q * Q) ***

ST#		1	2	3	4
1	N-N	10.4514	-0.4642	2.2800	-0.0515
	P-P	38.7061	-15.8487	-8.8015	-2.6029
	N-P	9.3474	-6.4428	1.4469	-0.8865
2	N-N	-0.4642	8.9588	2.8683	-0.2132
	P-P	-15.8487	43.5424	3.8506	-11.5812
	N-P	-6.4428	10.5546	2.2445	-4.2932
3	N-N	2.2800	2.8683	5.5360	0.2721
	P-P	-8.8015	3.8506	37.2192	-1.7482
	N-P	1.4469	2.2445	5.0119	-0.3427
4	N-N	-0.0515	-0.2132	0.2721	8.6332
	P-P	-2.6029	-11.5812	-1.7482	33.4843
	N-P	-0.8865	-4.2932	-0.3427	7.2719

```
*****   P R O B L E M   *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  8
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  6
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  6

      TOTAL  ANGULAR  MOMENTUM  =  2


   NUM  OF  STATES  =  105


   **  FILE-9  READ-IN : MAX(ND) = 6   MAX(LT) =  8   CALC.  DATE = 4-MAR-85

   # OF M.E. =    1577      NON-ZERO / TRI-ANGLE = 28.3 (%)
   FILE ACCESS (#3) =      0 (/19.1KB)      LOGICAL =    0

        **  C-TIME  IN  BSYSME  :     2.0  (SEC)

*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

   N =  1  A =    2.568  B =  1.777  B2= 0.32E+01
   N =  2  A =    3.513  B =  1.795  B2= 0.32E+01
   N =  3  A =    4.493  B =  2.549  B2= 0.65E+01
   N =  4  A =    4.073  B =  2.498  B2= 0.62E+01
   N =  5  A =    4.308  B =  2.323  B2= 0.54E+01
   N =  6  A =    4.876  B =  2.149  B2= 0.46E+01
   N =  7  A =    4.907  B =  2.221  B2= 0.49E+01
   N =  8  A =    5.334  B =  1.893  B2= 0.36E+01
   N =  9  A =    5.109  B =  2.084  B2= 0.43E+01
   N = 10  A =    5.837  B =  1.895  B2= 0.36E+01
   N = 11  A =    4.674  B =  2.652  B2= 0.70E+01
   N = 12  A =    4.360  B =  1.703  B2= 0.29E+01
   N = 13  A =    5.866  B =  2.011  B2= 0.40E+01
   N = 14  A =    4.910  B =  1.664  B2= 0.28E+01
   N = 15  A =    5.895  B =  1.565  B2= 0.25E+01
   N = 16  A =    6.027  B =  1.675  B2= 0.28E+01
   N = 17  A =    5.571  B =  1.782  B2= 0.32E+01
   N = 18  A =    5.837  B =  1.685  B2= 0.28E+01
   N = 19  A =    5.489  B =  1.870  B2= 0.35E+01
   N = 20  A =    5.672  B =  1.835  B2= 0.34E+01

        EIG =  -0.06984   0.88628   1.00180   1.71179   2.42581   2.67518
                2.95306   3.71302   3.92934   4.81480   5.17904   5.86558
                6.45398   6.89959   7.56933   7.97387   8.39283   8.76246
                8.96800   9.21362

   N = 21  A =    4.614  B =  2.179  B2= 0.47E+01

        EIG =  -0.06984   0.88628   1.00180   1.71178   2.29155   2.52665
                2.87898   3.29430   3.83330   4.44455   4.87772   5.42222
                5.97371   6.59647   7.07702   7.67095   8.06738   8.45575
                8.78701   8.99241

      ******  CONVERGED  AT  EIG(  1) =    -0.0698  ******
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```
   N = 22  A =    5.545  B =  1.579  B2= 0.25E+01

        EIG =  -0.06984   0.88628   1.00180   1.71175   1.90734   2.46945
                2.79829   3.04997   3.79102   4.06006   4.82742   5.20415
                5.84998   6.35529   6.77794   7.34327   7.77941   8.17047
                8.52597   8.80907

   N = 23  A =    5.659  B =  1.751  B2= 0.31E+01

        EIG =  -0.06984   0.88628   1.00180   1.71169   1.79307   2.46060
                2.76884   3.00899   3.74639   3.94004   4.74920   4.96255
                5.46441   5.95238   6.53442   6.93689   7.51730   7.87519
                8.24865   8.58067

   N = 24  A =    5.848  B =  1.717  B2= 0.29E+01

        EIG =  -0.06984   0.88628   1.00180   1.71163   1.76086   2.45669
                2.75004   2.98464   3.58684   3.84401   4.27928   4.83998
                5.23598   5.84987   6.29758   6.70714   7.16136   7.65170
                7.98813   8.32977

      ******  CONVERGED  AT  EIG(  2) =     0.8863  ******

   N = 25  A =    5.416  B =  1.610  B2= 0.26E+01

        EIG =  -0.06984   0.88628   1.00180   1.71158   1.75043   2.45387
                2.72807   2.94950   3.25998   3.79496   4.04004   4.79631
                5.02729   5.45652   5.92669   6.46957   6.83704   7.34627
                7.74143   8.08308

   N = 26  A =    5.892  B =  1.636  B2= 0.27E+01

        EIG =  -0.06984   0.88628   1.00180   1.71157   1.74743   2.45171
                2.69792   2.89109   3.09474   3.76220   3.94795   4.57412
                4.85999   5.26961   5.85177   6.23949   6.63107   6.99175
                7.48271   7.81032

      ******  CONVERGED  AT  EIG(  3) =     1.0018  ******

   N = 27  A =    6.045  B =  1.649  B2= 0.27E+01

        EIG =  -0.06984   0.88628   1.00180   1.71157   1.74671   2.45039
                2.66980   2.84811   3.04858   3.71698   3.88341   4.29307
                4.82736   5.13958   5.54774   5.93114   6.44878   6.79823
                7.24081   7.64591

   N = 28  A =    5.414  B =  1.705  B2= 0.29E+01

        EIG =  -0.06984   0.88628   1.00180   1.71156   1.74651   2.44947
                2.64424   2.81913   3.02341   3.55102   3.80873   4.04149
                4.69053   4.87806   5.27643   5.83106   6.12281   6.54295
                6.87963   7.35242

   N = 29  A =    5.686  B =  1.659  B2= 0.28E+01

        EIG =  -0.06984   0.88628   1.00180   1.71156   1.74645   2.44851
                2.61117   2.78808   2.98973   3.25472   3.76483   3.94132
                4.44142   4.83741   5.17395   5.56631   5.92276   6.40662
                6.72553   7.04465
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N = 30 A = 5.906 B = 1.705 B2= 0.29E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74643	2.44755
	2.57677	2.76023	2.94743	3.12749	3.73775	3.89710
	4.26416	4.80089	4.97003	5.31225	5.83497	6.09703
	6.51355	6.84161				

N = 31 A = 5.779 B = 1.823 B2= 0.33E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44659
	2.54756	2.73835	2.91004	3.07928	3.67802	3.83548
	4.05746	4.57883	4.84797	5.20094	5.59027	5.91851
	6.36358	6.64932				

N = 32 A = 6.113 B = 1.431 B2= 0.20E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44546
	2.52246	2.71888	2.87773	3.05010	3.48904	3.77643
	3.95042	4.40048	4.82594	5.07157	5.36069	5.84596
	6.09846	6.49949				

N = 33 A = 5.778 B = 1.431 B2= 0.20E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44482
	2.51194	2.70958	2.86263	3.03669	3.37380	3.75933
	3.92215	4.29957	4.77103	4.89435	5.23773	5.61987
	5.91253	6.29609				

****** CONVERGED AT EIG(4) = 1.7116 ******

N = 34 A = 5.876 B = 1.415 B2= 0.20E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44457
	2.50832	2.70567	2.85572	3.02940	3.30901	3.74451
	3.89363	4.14461	4.53637	4.83671	5.12330	5.39440
	5.84700	6.07937				

N = 35 A = 6.166 B = 1.435 B2= 0.21E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44450
	2.50732	2.70432	2.85297	3.02572	3.27343	3.72119
	3.84758	4.01398	4.42173	4.82169	5.01552	5.29240
	5.69520	5.92344				

****** CONVERGED AT EIG(5) = 1.7464 ******

N = 36 A = 5.562 B = 1.714 B2= 0.29E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44448
	2.50701	2.70380	2.85169	3.02344	3.24647	3.64899
	3.78757	3.94645	4.31436	4.68741	4.84886	5.14874
	5.40547	5.83742				

N = 37 A = 5.161 B = 1.659 B2= 0.28E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44446
	2.50673	2.70308	2.84891	3.01034	3.10099	3.34947
	3.74193	3.88202	4.07308	4.44777	4.82397	5.02224
	5.28784	5.64819				

N = 38 A = 5.871 B = 1.433 B2= 0.21E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44445
	2.50635	2.69955	2.77265	2.86121	3.02942	3.28878
	3.72346	3.84652	4.00365	4.39304	4.79840	4.90484
	5.19256	5.43977				

N = 39 A = 5.615 B = 1.267 B2= 0.16E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50600	2.66402	2.71094	2.85578	3.02739	3.27736
	3.70706	3.82019	3.96865	4.31257	4.58106	4.83191
	5.05891	5.30322				

N = 40 A = 6.577 B = 1.364 B2= 0.19E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50589	2.64657	2.70861	2.85523	3.02700	3.27392
	3.69276	3.80200	3.94595	4.20847	4.47532	4.82297
	5.00031	5.25546				

N = 41 A = 5.719 B = 2.827 B2= 0.80E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50587	2.64255	2.70825	2.85510	3.02688	3.27246
	3.67702	3.78527	3.92204	4.10788	4.42000	4.78867
	4.87106	5.11296				

N = 42 A = 2.352 B = 2.238 B2= 0.50E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50589	2.64623	2.70857	2.85521	3.02698	3.27368
	3.69047	3.79925	3.94211	4.18849	4.46261	4.82069
	4.98278	5.23701				

N = 43 A = 5.487 B = 1.470 B2= 0.22E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50588	2.64499	2.70846	2.85518	3.02695	3.27333
	3.68731	3.79569	3.93706	4.16363	4.44727	4.81475
	4.93640	5.16175				

N = 44 A = 5.973 B = 1.440 B2= 0.21E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50588	2.64477	2.70844	2.85517	3.02694	3.27320
	3.68518	3.79290	3.93173	4.12642	4.39198	4.56161
	4.82454	5.00183				

N = 45 A = 5.931 B = 1.472 B2= 0.22E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50588	2.64471	2.70843	2.85517	3.02694	3.27313
	3.68093	3.78369	3.88540	3.97115	4.20955	4.46377
	4.81951	4.96969				

N = 46 A = 6.015 B = 1.632 B2= 0.27E+01

EIG =	-0.06984	0.88628	1.00180	1.71156	1.74642	2.44443
	2.50588	2.64469	2.70843	2.85517	3.02693	3.27305
	3.61264	3.69871	3.80148	3.94144	4.17353	4.44828

```
              4.80484   4.87267

    ******  CONVERGED  AT  EIG(  6) =     2.4444  ******

N = 47  A =    6.015  B =  1.392  B2= 0.19E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64468   2.70843   2.85516   3.02693   3.27289
              3.41202   3.68810   3.79570   3.93568   4.14332   4.39046
              4.52252   4.82194

N = 48  A =    5.606  B =  1.222  B2= 0.15E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.26938
              3.28116   3.68570   3.79271   3.92786   4.05461   4.22795
              4.46248   4.81747

N = 49  A =    6.132  B =  1.150  B2= 0.13E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.22442
              3.27368   3.68426   3.78956   3.90300   3.97066   4.19012
              4.45155   4.78037

    ******  CONVERGED  AT  EIG(  7) =     2.5059  ******

N = 50  A =    6.639  B =  1.288  B2= 0.17E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21381
              3.27356   3.68367   3.78753   3.88042   3.95576   4.18146
              4.44565   4.68595

N = 51  A =    6.275  B =  1.510  B2= 0.23E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21135
              3.27354   3.68341   3.78629   3.86826   3.95136   4.17633
              4.43674   4.57966

N = 52  A =    4.320  B =  2.742  B2= 0.75E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.20064
              3.27339   3.35091   3.68393   3.78823   3.88576   3.95758
              4.18191   4.44530

N = 53  A =    3.930  B =  1.610  B2= 0.26E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21157
              3.27354   3.68342   3.78632   3.86840   3.95134   4.17603
              4.43455   4.55968

N = 54  A =    6.201  B =  1.359  B2= 0.18E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21131
              3.27354   3.68338   3.78604   3.86561   3.95040   4.17377
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              4.41479   4.49402

    ******  CONVERGED  AT  EIG(  8) =     2.6447  ******

N = 55  A =    6.318  B =  1.537  B2= 0.24E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21124
              3.27354   3.68336   3.78589   3.86398   3.94978   4.17068
              4.33795   4.45639

N = 56  A =    6.122  B =  1.213  B2= 0.15E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21121
              3.27354   3.68333   3.78565   3.86068   3.94787   4.07140
              4.18198   4.43867

    ******  CONVERGED  AT  EIG(  9) =     2.7084  ******

N = 57  A =    6.024  B =  1.269  B2= 0.16E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68331   3.78503   3.84381   3.90122   3.95476
              4.17620   4.42820

N = 58  A =    5.572  B =  2.140  B2= 0.46E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68320   3.73241   3.78698   3.86903   3.95099
              4.17360   4.37532

    ******  CONVERGED  AT  EIG( 10) =     2.8552  ******

N = 59  A =    3.882  B =  2.489  B2= 0.62E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68331   3.78506   3.84426   3.90084   3.95458
              4.17604   4.42656

N = 60  A =    4.897  B =  1.529  B2= 0.23E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68328   3.77833   3.79384   3.87316   3.95163
              4.17449   4.39955

    ******  CONVERGED  AT  EIG( 11) =     3.0269  ******

N = 61  A =    6.448  B =  1.130  B2= 0.13E+01

     EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68324   3.75036   3.78746   3.86952   3.95100
              4.17283   4.31655
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N = 62  A =    6.691  B =  1.104  B2= 0.12E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68323   3.74122   3.78708   3.86874   3.95082
              4.17145   4.27021

N = 63  A =    6.551  B =  1.588  B2= 0.25E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68323   3.73914   3.78702   3.86855   3.95077
              4.17066   4.25267

N = 64  A =    5.687  B =  1.746  B2= 0.30E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68322   3.73648   3.78693   3.86822   3.95064
              4.13281   4.17780

N = 65  A =    5.202  B =  1.995  B2= 0.40E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.25175   3.27354   3.68323   3.74099   3.78707   3.86869
              3.95080   4.17109

N = 66  A =    3.904  B =  1.578  B2= 0.25E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68322   3.73684   3.78693   3.86823   3.95063
              4.09572   4.17436

N = 67  A =    5.955  B =  1.335  B2= 0.18E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68322   3.73215   3.78671   3.86177   3.88045
              3.95107   4.17193

    ****** CONVERGED  AT  EIG( 12) =     3.2112  ******

N = 68  A =    5.825  B =  1.185  B2= 0.14E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68320   3.71931   3.77923   3.78943   3.86931
              3.95088   4.17148

N = 69  A =    6.291  B =  1.270  B2= 0.16E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.68315   3.69654   3.75618   3.78741   3.86898
              3.95084   4.17108

    ****** CONVERGED  AT  EIG( 13) =     3.2735  ******
```



```
N = 70  A =    6.197  B =  1.163  B2= 0.14E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67876   3.68345   3.74984   3.78725   3.86885
              3.95081   4.17012

N = 71  A =    5.948  B =  1.948  B2= 0.38E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.66907   3.68329   3.74740   3.78719   3.86876
              3.95079   4.13865

N = 72  A =    3.883  B =  2.139  B2= 0.46E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67956   3.68349   3.74999   3.78725   3.86885
              3.95081   4.16995

N = 73  A =    5.087  B =  1.658  B2= 0.27E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67352   3.68332   3.74842   3.78722   3.86880
              3.95080   4.16477

N = 74  A =    3.445  B =  3.198  B2= 0.10E+02

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67826   3.68342   3.74956   3.78724   3.86883
              3.95081   4.16929

N = 75  A =    4.050  B =  1.667  B2= 0.28E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67370   3.68333   3.74845   3.78722   3.86880
              3.95080   4.16452

N = 76  A =    6.286  B =  1.019  B2= 0.10E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67316   3.68332   3.74831   3.78721   3.86880
              3.95080   4.15896

N = 77  A =    6.462  B =  0.913  B2= 0.83E+00

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67305   3.68332   3.74828   3.78721   3.86879
              3.95080   4.15599

N = 78  A =    6.060  B =  1.043  B2= 0.11E+01

      EIG =  -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
              2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
              3.27354   3.67304   3.68332   3.74827   3.78721   3.86879
```

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```
                3.95080   4.15486

 N = 79  A =    6.379  B =  0.607  B2= 0.37E+00

      EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
               2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
               3.27354   3.67303   3.68332   3.74827   3.78721   3.86879
               3.95080   4.15425

 N = 80  A =    7.236  B =  1.302  B2= 0.17E+01

      EIG =   -0.06984   0.88628   1.00180   1.71156   1.74642   2.44443
               2.50588   2.64467   2.70843   2.85516   3.02693   3.21120
               3.27354   3.67303   3.68332   3.74827   3.78721   3.86879
               3.95080   4.15419

**********************************************************************
***                                                                ***
***   J =  2     DIM =  105     BE =  0.633                        ***
***                                                                ***
***   TRUNCATION  :  TOTAL =  8     NEUTRON =  2     PROTON =  6   ***
***                                                                ***
      EIG       :   -0.070    0.886    1.002    1.712    1.746    2.444
                     2.506    2.645    2.708    2.855    3.027    3.211
                     3.274    3.673    3.683    3.748    3.787    3.869
                     3.951    4.154
***                                                                ***
      EIG + BE  :    0.563    1.519    1.635    2.344    2.379    3.077
                     3.139    3.277    3.341    3.488    3.660    3.844
                     3.906    4.306    4.316    4.381    4.420    4.502
                     4.584    4.787
***                                                                ***
**********************************************************************

      ********  AMPLITUDE  IN  THE  LANCZOS  BASIS  ********

      --- NO. 1 ---
      -0.22297  0.33108 -0.44006  0.55449 -0.47066  0.29082 -0.16046  0.07813
      -0.03479  0.01550 -0.01006  0.00692 -0.00234  0.00105 -0.00032  0.00009
      -0.00003  0.00001  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

      --- NO. 2 ---
      -0.40206  0.38065 -0.15904 -0.04310  0.21729 -0.27373  0.27323 -0.22975
       0.21929 -0.23571  0.37468 -0.36678  0.16475 -0.09741  0.03638 -0.01287
       0.00549 -0.00235  0.00110 -0.00060  0.00043 -0.00023  0.00009 -0.00004
       0.00002 -0.00001  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
       0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

      --- NO. 3 ---
```



```
-0.40147  0.35398 -0.09783 -0.11534  0.24168 -0.21996  0.13524 -0.02494
-0.10161  0.22292 -0.45714  0.47377 -0.22246  0.13696 -0.05274  0.01928
-0.00855  0.00380 -0.00188  0.00107 -0.00082  0.00046 -0.00019  0.00008
-0.00004  0.00001 -0.00001  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 4 ---
-0.37389  0.18031  0.18908 -0.33331  0.12219  0.22177 -0.45859  0.44517
-0.31395  0.10752  0.11122 -0.20108  0.13953 -0.11799  0.05811 -0.02989
 0.02271 -0.02110  0.02763 -0.03679  0.05126 -0.03730  0.01984 -0.01109
 0.00648 -0.00309  0.00151 -0.00089  0.00049 -0.00025  0.00013 -0.00006
 0.00003 -0.00001  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 5 ---
 0.03392 -0.01569 -0.01812  0.03058 -0.00999 -0.02186  0.04263 -0.03951
 0.02487 -0.00425 -0.01819  0.02311 -0.00715 -0.00491  0.01799 -0.04246
 0.09170 -0.15694  0.28397 -0.42681  0.62369 -0.46151  0.24970 -0.14190
 0.08425 -0.04067  0.02016 -0.01220  0.00673 -0.00345  0.00187 -0.00090
 0.00037 -0.00015  0.00006 -0.00003  0.00002 -0.00001  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 6 ---
 0.12961 -0.00905 -0.12288  0.10512  0.05686 -0.15863  0.11800  0.02267
-0.17307  0.20073 -0.16904 -0.00130  0.26471 -0.44921  0.34556 -0.28431
 0.28518 -0.23321  0.16798 -0.06325 -0.05992  0.11295 -0.13915  0.15363
-0.16255  0.13614 -0.12697  0.14212 -0.12468  0.09750 -0.07658  0.04887
-0.02769  0.01564 -0.00993  0.01033 -0.01048  0.00649 -0.00338  0.00111
-0.00022 -0.00027  0.00027 -0.00015  0.00008 -0.00004  0.00003 -0.00001
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 7 ---
-0.07619  0.00268  0.07389 -0.05949 -0.03808  0.09350 -0.06194 -0.02352
 0.10782 -0.11334  0.08066  0.01503 -0.14198  0.22447 -0.15266  0.09193
-0.05060  0.00063  0.05223 -0.08388  0.09151 -0.01791 -0.09182  0.18150
-0.25953  0.27552 -0.31491  0.40241 -0.38166  0.31786 -0.26237  0.17368
-0.10349  0.06294 -0.04527  0.05343 -0.05738  0.03662 -0.01955  0.00655
-0.00138 -0.00159  0.00164 -0.00090  0.00051 -0.00029  0.00017 -0.00009
 0.00003 -0.00001  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 8 ---
 0.03336  0.00143 -0.03371  0.02343  0.02100 -0.04023  0.01906  0.01951
-0.05009  0.04152 -0.01486 -0.01830  0.04157 -0.05109  0.01930  0.01424
```

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```
-0.04679  0.06347 -0.07076  0.05040 -0.01105 -0.03246  0.07489 -0.09966
 0.10950 -0.08218  0.05539 -0.03267 -0.00053  0.03453 -0.06553  0.08035
-0.11121  0.16319 -0.26028  0.47787 -0.59547  0.40948 -0.23234  0.08139
-0.01887 -0.01875  0.02140 -0.01283  0.00783 -0.00492  0.00310 -0.00174
 0.00068 -0.00022  0.00008  0.00001 -0.00005  0.00003 -0.00001  0.00001
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO. 9 ---
-0.16112 -0.01269  0.16513 -0.10666 -0.11025  0.19058 -0.07303 -0.11214
 0.24125 -0.17610  0.02540  0.10700 -0.14333  0.13443 -0.00460 -0.13356
 0.26893 -0.30656  0.28477 -0.14706 -0.05267  0.16995 -0.23266  0.23885
-0.19935  0.08049  0.03953 -0.15981  0.21533 -0.22211  0.20694 -0.14075
 0.07118 -0.01192 -0.04530  0.12092 -0.16339  0.11661 -0.06815  0.02440
-0.00591 -0.00548  0.00660 -0.00413  0.00264 -0.00173  0.00113 -0.00065
 0.00026 -0.00009  0.00003  0.00000 -0.00002  0.00001  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO.10 ---
 0.20947  0.03380 -0.21969  0.11733  0.16698 -0.23058  0.03630  0.18960
-0.29093  0.14248  0.09579 -0.16750 -0.00116  0.14352 -0.17581  0.18889
-0.19341  0.11727 -0.00303 -0.10143  0.15879 -0.04278 -0.14626  0.27278
-0.32616  0.22783 -0.10199 -0.02873  0.14180 -0.21233  0.24188 -0.18927
 0.12268 -0.06130  0.00681  0.04472 -0.07633  0.05988 -0.03763  0.01421
-0.00384 -0.00297  0.00418 -0.00296  0.00214 -0.00158  0.00112 -0.00070
 0.00030 -0.00010  0.00004  0.00000 -0.00002  0.00001 -0.00001  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO.11 ---
-0.18303 -0.04723  0.19392 -0.07825 -0.16513  0.17520  0.02777 -0.19305
 0.20275 -0.02726 -0.18260  0.13288  0.18035 -0.36705  0.19732  0.02860
-0.23567  0.30963 -0.26713  0.07257  0.16760 -0.18324  0.06096  0.07355
-0.18297  0.19305 -0.15807  0.09775  0.01609 -0.12620  0.19741 -0.17993
 0.13646 -0.08241  0.02795  0.02009 -0.05311  0.04757 -0.03289  0.01337
-0.00425 -0.00240  0.00465 -0.00411  0.00368 -0.00323  0.00260 -0.00179
 0.00082 -0.00030  0.00012  0.00000 -0.00007  0.00004 -0.00003  0.00002
-0.00001  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO.12 ---
 0.00386  0.00140 -0.00406  0.00106  0.00378 -0.00292 -0.00182  0.00422
-0.00259 -0.00147  0.00489 -0.00165 -0.00650  0.00997 -0.00232 -0.00662
 0.01329 -0.01139  0.00369  0.00577 -0.01150  0.00255  0.01211 -0.01922
 0.01716 -0.00300 -0.01197  0.02354 -0.01883  0.00389  0.01218 -0.02079
 0.02663 -0.02699  0.02390 -0.02261  0.01100  0.01042 -0.03208  0.04907
-0.09128  0.05727  0.13732 -0.29977  0.43494 -0.51057  0.48481 -0.37769
 0.18778 -0.07554  0.03334 -0.00322 -0.01706  0.01311 -0.00863  0.00585
-0.00311  0.00129  0.00042 -0.00122  0.00067 -0.00026  0.00013 -0.00010
 0.00002  0.00007 -0.00006  0.00004 -0.00002  0.00001  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO.13 ---
-0.04641 -0.01842  0.04839 -0.01017 -0.04613  0.03148  0.02639 -0.04987
 0.02333  0.02474 -0.05914  0.01355  0.08346 -0.11905  0.01618  0.09946
-0.17864  0.13686 -0.01933 -0.10045  0.15101 -0.00832 -0.19643  0.27511
-0.21206 -0.01127  0.22670 -0.36975  0.24482  0.02404 -0.27536  0.35590
```



```
-0.35521  0.26581 -0.12972 -0.00055  0.10932 -0.12381  0.09780 -0.04065
 0.00763  0.01302 -0.00428 -0.01338  0.02945 -0.04010  0.04079 -0.03330
 0.01708 -0.00707  0.00323 -0.00039 -0.00163  0.00132 -0.00092  0.00065
-0.00036  0.00016  0.00004 -0.00015  0.00008 -0.00003  0.00002 -0.00001
 0.00000  0.00001 -0.00001  0.00001  0.00000  0.00000  0.00000  0.00000
 0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000  0.00000

--- NO.14 ---
 0.00814  0.00506 -0.00761 -0.00112  0.00794 -0.00097 -0.00804  0.00541
 0.00469 -0.00814  0.00414  0.00426 -0.00816  0.00530  0.00593 -0.01405
 0.01421 -0.00193 -0.01254  0.01391 -0.00238 -0.01069  0.01596 -0.00846
-0.00556  0.01504 -0.01493  0.00656  0.00775 -0.01614  0.01359 -0.00060
-0.01629  0.02457 -0.02178  0.01362  0.00322 -0.01696  0.02228 -0.01496
 0.01116 -0.00085 -0.01460  0.01931 -0.01595  0.00558  0.00637 -0.01727
 0.02005 -0.02451  0.03854 -0.04549 -0.01050  0.07918 -0.13486  0.16202
-0.15618  0.13442 -0.02668 -0.11338  0.13416 -0.17601  0.34394 -0.50108
 0.26532  0.23502 -0.36977  0.35412 -0.22625  0.13598 -0.04795 -0.02516
 0.04612 -0.00687 -0.02440  0.01871 -0.00806  0.00374 -0.00150  0.00026

--- NO.15 ---
-0.12557 -0.07880  0.11680  0.01841 -0.12207  0.01305  0.12471 -0.08134
-0.07538  0.12547 -0.05969 -0.06735  0.11972 -0.07290 -0.09097  0.20607
-0.20333  0.02172  0.18717 -0.20026  0.02632  0.15743 -0.22197  0.10854
 0.08956 -0.21216  0.19834 -0.07355 -0.11724  0.21701 -0.16877 -0.00902
 0.23025 -0.32814  0.27570 -0.15355 -0.06246  0.21429 -0.25473  0.14588
-0.07291 -0.01790  0.08148 -0.07271  0.03247  0.02153 -0.06004  0.07529
-0.05006  0.02656 -0.01625  0.00523  0.00774 -0.01010  0.00955 -0.00744
 0.00285  0.00185 -0.00333 -0.00133  0.00646 -0.01402  0.03159 -0.04730
 0.02557  0.02192 -0.03539  0.03430 -0.02210  0.01337 -0.00475 -0.00245
 0.00456 -0.00069 -0.00241  0.00186 -0.00081  0.00038 -0.00015  0.00003

--- NO.16 ---
 0.03484  0.02313 -0.03145 -0.00711  0.03302 -0.00032 -0.03552  0.01884
 0.02590 -0.03403  0.00902  0.02116 -0.02165  0.00488  0.02276 -0.03642
 0.02827  0.00531 -0.03646  0.02915  0.00660 -0.02717  0.02182  0.00069
-0.02309  0.02318 -0.00767 -0.01232  0.01945 -0.01005 -0.00621  0.01632
-0.01905  0.01069  0.00318 -0.01590  0.01416  0.00436 -0.02286  0.02874
-0.03837  0.01287  0.05651 -0.08643  0.07588 -0.02801 -0.02954  0.08092
-0.08935  0.09918 -0.14280  0.15432  0.04650 -0.26816  0.42894 -0.47988
 0.39549 -0.25037 -0.02112  0.21649 -0.12825  0.01345  0.09545 -0.17784
 0.11072  0.07490 -0.14735  0.15497 -0.10547  0.06658 -0.02497 -0.01154
 0.02346 -0.00406 -0.01255  0.01005 -0.00451  0.00219 -0.00091  0.00016

--- NO.17 ---
-0.26513 -0.18187  0.23461  0.06315 -0.24667 -0.01257  0.27301 -0.12547
-0.21776  0.25213 -0.03322 -0.16904  0.10858  0.03087 -0.15207  0.17199
-0.08787 -0.07370  0.18251 -0.09962 -0.08365  0.11567 -0.01334 -0.09002
 0.12160 -0.02700 -0.08491  0.14302 -0.05429 -0.08483  0.15823 -0.09350
-0.04963  0.16261 -0.18989  0.15450 -0.00105 -0.15877  0.23201 -0.15503
 0.10162  0.00539 -0.12495  0.13626 -0.07934 -0.01770  0.09572 -0.13238
 0.08797 -0.03866  0.00705  0.02136 -0.00803 -0.03568  0.07289 -0.08844
 0.07785 -0.05266 -0.00224  0.04538 -0.02929  0.00756  0.01010 -0.02284
 0.01567  0.00887 -0.02046  0.02274 -0.01604  0.01040 -0.00403 -0.00174
 0.00375 -0.00070 -0.00202  0.00166 -0.00076  0.00038 -0.00016  0.00003

--- NO.18 ---
 0.15116  0.11063 -0.12768 -0.04667  0.13412  0.02480 -0.15660  0.04920
 0.14565 -0.13140 -0.02372  0.10108  0.00780 -0.09331  0.04895  0.03582
-0.09191  0.05414  0.03393 -0.07818  0.04226  0.05139 -0.11289  0.06909
 0.03550 -0.10782  0.09842 -0.02292 -0.07445  0.10505 -0.05305 -0.04269
 0.13449 -0.13678  0.05804  0.04192 -0.08999  0.02680  0.06675 -0.12230
 0.18083 -0.05930 -0.26869  0.38601 -0.28994  0.02875  0.22371 -0.37847
```

JAERI-M 85-094

```
 0.28314 -0.15496  0.08042  0.00402 -0.04495 -0.00514  0.06206 -0.09433
 0.09656 -0.07379  0.00148  0.06347 -0.04508  0.01702  0.00265 -0.01630
 0.01457  0.00452 -0.01852  0.02359 -0.01807  0.01245 -0.00518 -0.00190
 0.00473 -0.00102 -0.00259  0.00224 -0.00108  0.00057 -0.00025  0.00004

--- NO.19 ---
-0.18756 -0.14593  0.15004  0.07088 -0.15660 -0.05210  0.19170 -0.03211
-0.20146  0.14117  0.08107 -0.12297 -0.09672  0.19620  0.00385 -0.21335
 0.26088 -0.03668 -0.23470  0.22606  0.02710 -0.19867  0.16321  0.01988
-0.18837  0.15023  0.00707 -0.15800  0.12873  0.02776 -0.15710  0.13155
 0.00140 -0.13340  0.18011 -0.14656 -0.01298  0.16090 -0.20050  0.08128
 0.02970 -0.05779 -0.07881  0.17031 -0.15880  0.04710  0.08366 -0.17922
 0.14743 -0.08913  0.05436 -0.00765 -0.02891  0.01267  0.01327 -0.03163
 0.03980 -0.03477  0.00275  0.02998 -0.02302  0.01030 -0.00200 -0.00388
 0.00568 -0.00017 -0.00719  0.01099 -0.00927  0.00683 -0.00307 -0.00093
 0.00276 -0.00069 -0.00154  0.00141 -0.00072  0.00040 -0.00018  0.00003

--- NO.20 ---
 0.02362  0.02108 -0.01584 -0.01274  0.01576  0.01265 -0.02128 -0.00503
 0.02811 -0.00831 -0.02353  0.01055  0.03537 -0.03904 -0.02503  0.06935
-0.05414 -0.02213  0.07933 -0.03666 -0.05051  0.04155  0.03311 -0.06591
 0.03123  0.04583 -0.07942  0.04559  0.04316 -0.08667  0.04703  0.03916
-0.11348  0.08964  0.00568 -0.09633  0.07438  0.05438 -0.15123  0.11281
-0.05993 -0.02127  0.05860 -0.02074 -0.03363  0.06088 -0.03908 -0.01914
 0.06727 -0.09531  0.12379 -0.09255 -0.06260  0.14896 -0.15024  0.07975
 0.06098 -0.16611  0.07389  0.15096 -0.19357  0.18864 -0.23543  0.22427
 0.01721 -0.20521 -0.05431  0.31580 -0.38393  0.35130 -0.19770 -0.02761
 0.17648 -0.06366 -0.10559  0.11555 -0.06894  0.04532 -0.02247  0.00443
```

```
**********************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
**********************************************
      ND    0   1   2   3   4   5   6   7   8
 ST. #
----------------------------------------------
    1       0  69   9  20   2   1   0   0   0
    2       0  18  65   4  12   1   0   0   0
    3       0  68   7  19   4   2   0   0   0
    4       0   5  68  12  10   4   1   0   0
    5       0  13  20  43  12  10   1   0   0
    6       0   1  73   9  15   1   1   0   0
    7       0   4   0  75  13   8   1   0   0
    8       0   1  15  46  27   7   3   0   0
    9       0   5   3  67  10  12   2   1   0
   10       0   0   9  26  46  10   8   1   0
   11       0   2   1  25  63   3   6   0   0
   12       0   1   1  86   5   7   0   0   0
   13       0   1   2  71  19   7   1   0   0
   14       0   1   3  18  55  16   5   1   0
   15       0   4   1  54  24  15   2   0   0
   16       0   3   1  18  52  18   6   1   0
   17       0   1   4  10  53  19  11   3   0
   18       0   0   1  11  54  23   8   3   0
   19       0   0   0   7  59  24   7   2   0
   20       0   0   2   1  87   9   1   0   0
**********************************************
```

```
**************************************************************************
        WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                            FIRST  105  AMPLITUDES  ARE  PRINTED
                            TOTAL  DIMENSION  =   105
```



```
ND(TOT)   1      1      2      2      2      3      3      3      3      3
ND  (N)   1      0      2      1      0      2      2      2      1      1
L   (N)   2      0      2      2      0      0      2      4      2      2
ND  (P)   0      1      0      1      2      1      1      1      2      2
L   (P)   0      2      0      2      2      2      2      2      0      2
-------------------------------------------------------------------------
NO. 1  -0.534 -0.633  0.083  0.248  0.129 -0.121 -0.118 -0.173 -0.159 -0.176
       -0.267 -0.098  0.043  0.042  0.021  0.050  0.048  0.066  0.034  0.052
        0.002  0.064  0.016  0.010 -0.035 -0.016 -0.025  0.019 -0.032 -0.035
       -0.010 -0.032 -0.053 -0.016 -0.019 -0.005 -0.029  0.005 -0.005  0.001
        0.007  0.005  0.005  0.004  0.004  0.008 -0.004  0.007  0.005  0.009
       -0.004  0.000  0.013  0.003  0.003 -0.002  0.000  0.005  0.002  0.000
        0.000 -0.002  0.001 -0.001 -0.002  0.000  0.001 -0.002 -0.001 -0.002
        0.001 -0.001 -0.002  0.000  0.000 -0.003  0.001  0.000  0.000 -0.001
        0.000  0.000 -0.001  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000

NO. 2   0.046 -0.422 -0.247 -0.527 -0.555  0.031  0.026  0.071  0.057 -0.158
       -0.084 -0.009 -0.102 -0.071  0.027 -0.048 -0.069 -0.141 -0.066 -0.125
       -0.180 -0.148 -0.065  0.005  0.004  0.002  0.023  0.042  0.008  0.020
       -0.035 -0.010 -0.004  0.014 -0.007  0.024  0.008 -0.025  0.003 -0.006
       -0.023  0.003 -0.010  0.004 -0.018 -0.008  0.021 -0.011 -0.008 -0.023
       -0.014 -0.027 -0.022 -0.006 -0.009 -0.001 -0.012 -0.012  0.001 -0.002
        0.000  0.001 -0.003  0.001  0.003  0.000  0.003  0.003  0.000  0.002
       -0.002 -0.002  0.001  0.003 -0.003  0.002 -0.004  0.001  0.000  0.000
        0.001  0.001  0.001 -0.001 -0.001 -0.001  0.000  0.000  0.000  0.000
       -0.001  0.000  0.000  0.001  0.000  0.000  0.000  0.000 -0.001  0.000
        0.000 -0.001 -0.001  0.000  0.000

NO. 3  -0.746  0.356 -0.020 -0.092 -0.241  0.002 -0.140 -0.198  0.107  0.156
        0.261  0.163 -0.028 -0.031 -0.010 -0.050  0.000 -0.034 -0.059 -0.089
       -0.027 -0.125 -0.044 -0.023  0.048  0.019  0.030 -0.022  0.043  0.039
        0.014  0.038  0.072  0.034  0.038  0.014  0.061 -0.013  0.015 -0.004
       -0.016 -0.010 -0.011 -0.008 -0.009 -0.017  0.010 -0.013 -0.010 -0.018
        0.005 -0.004 -0.028 -0.008 -0.010  0.004 -0.002 -0.014 -0.005 -0.002
       -0.001  0.006 -0.002  0.003  0.004 -0.001 -0.002  0.006  0.001  0.006
       -0.002  0.001  0.005  0.002  0.000  0.009 -0.003  0.002  0.000  0.002
        0.001  0.000  0.003 -0.001 -0.001 -0.001 -0.001 -0.001  0.000  0.000
       -0.001  0.000 -0.001  0.001  0.000 -0.001 -0.001  0.000 -0.001  0.000
        0.000  0.000 -0.001  0.000  0.000

NO. 4  -0.144  0.157 -0.686 -0.336  0.317  0.066 -0.163 -0.002 -0.167  0.005
       -0.061 -0.236  0.047 -0.007  0.036 -0.007  0.018 -0.027  0.105  0.161
        0.094  0.188  0.115  0.041 -0.052 -0.017 -0.053 -0.012 -0.037 -0.063
        0.005 -0.020 -0.040 -0.071 -0.061 -0.037 -0.106  0.035 -0.035  0.013
        0.038  0.013  0.023  0.011  0.022  0.029 -0.023  0.028  0.020  0.040
        0.001  0.019  0.045  0.021  0.027 -0.008  0.012  0.037  0.010  0.006
        0.003 -0.013  0.006 -0.007 -0.010  0.001  0.002 -0.013 -0.002 -0.013
        0.004 -0.001 -0.011 -0.005  0.003 -0.018  0.008 -0.004  0.001 -0.004
       -0.003 -0.001 -0.007  0.003  0.002  0.003  0.002  0.002 -0.001  0.001
        0.002  0.000  0.002 -0.002 -0.001  0.002  0.002  0.000  0.003  0.000
       -0.001  0.001  0.004  0.000  0.001

NO. 5  -0.036 -0.359 -0.283  0.044  0.338  0.224  0.055  0.212  0.291  0.200
        0.102  0.443 -0.001 -0.067 -0.128 -0.094 -0.094 -0.017 -0.076 -0.090
        0.245 -0.029 -0.022 -0.105  0.108  0.034  0.058 -0.042  0.031  0.113
        0.032  0.076  0.063  0.100  0.137  0.005  0.172  0.012  0.056 -0.001
       -0.010 -0.033 -0.024 -0.034  0.004 -0.039 -0.015 -0.030 -0.018 -0.022
        0.036  0.040 -0.023 -0.021 -0.020  0.020  0.023 -0.028 -0.023 -0.003
       -0.007  0.021  0.000  0.009  0.011 -0.004 -0.014  0.015  0.005  0.018
       -0.003  0.009  0.019 -0.001  0.005  0.027  0.000  0.006 -0.001  0.008
```

	0.001	-0.002	0.010	0.000	-0.002	-0.002	-0.003	-0.002	0.001	-0.002
	-0.001	0.001	-0.003	0.000	0.001	-0.002	-0.002	-0.001	-0.002	0.003
	0.001	0.002	-0.004	0.000	-0.002					
NO. 6	0.091	0.039	-0.490	0.593	-0.376	0.108	-0.172	0.110	-0.100	0.150
	-0.087	-0.043	0.103	0.085	-0.071	0.051	0.074	0.225	-0.099	-0.017
	-0.136	-0.166	-0.100	-0.019	-0.012	0.010	-0.022	-0.013	0.002	-0.024
	0.047	0.006	-0.029	0.001	-0.006	0.033	-0.004	-0.039	0.002	-0.017
	-0.022	-0.005	-0.003	0.000	-0.025	-0.005	0.030	-0.005	-0.021	-0.012
	-0.006	-0.033	-0.034	-0.014	-0.015	0.004	-0.024	-0.026	-0.005	-0.006
	-0.001	0.001	-0.007	0.003	0.003	-0.001	0.006	0.005	0.001	0.002
	-0.004	-0.002	0.002	0.007	-0.005	0.001	-0.009	0.001	-0.001	0.000
	0.003	0.002	0.002	-0.003	-0.003	-0.002	0.000	-0.001	0.000	0.000
	-0.002	0.000	-0.001	0.002	0.001	-0.001	-0.001	0.000	-0.002	-0.001
	0.001	-0.002	-0.003	-0.001	0.000					
NO. 7	-0.095	0.171	0.013	-0.030	0.030	-0.384	-0.155	0.323	0.406	0.175
	-0.524	0.015	0.025	-0.069	0.077	0.205	-0.145	-0.037	-0.043	-0.114
	-0.098	0.151	-0.058	0.060	-0.015	0.037	0.051	0.016	-0.054	0.146
	0.005	0.016	-0.210	0.048	-0.001	0.022	-0.028	-0.006	0.003	-0.008
	-0.015	0.013	-0.017	0.008	-0.009	0.012	-0.001	-0.029	-0.011	-0.028
	-0.015	-0.017	0.049	-0.006	-0.016	-0.012	-0.021	-0.004	0.014	-0.004
	0.002	0.001	-0.003	0.002	0.005	0.002	0.005	0.000	-0.002	0.008
	-0.002	-0.004	0.001	0.004	-0.003	-0.006	0.001	0.002	0.000	0.000
	0.002	0.002	0.000	-0.002	0.000	-0.002	0.001	-0.001	0.000	0.000
	-0.001	-0.001	0.000	0.001	-0.001	-0.001	0.000	0.001	-0.002	-0.001
	-0.001	-0.002	0.000	0.000	0.001					
NO. 8	-0.065	0.085	-0.267	0.206	0.194	-0.080	0.355	-0.050	0.247	-0.477
	0.183	0.024	-0.150	0.042	0.116	0.085	0.011	-0.037	0.156	-0.187
	-0.277	0.051	-0.202	0.207	-0.017	-0.035	0.103	0.113	0.041	0.040
	-0.129	-0.097	0.052	0.057	-0.072	0.046	0.027	-0.072	0.006	-0.030
	-0.056	0.048	-0.021	0.036	-0.008	-0.002	0.023	-0.016	0.034	-0.060
	-0.061	-0.060	-0.002	-0.003	-0.044	-0.045	-0.077	-0.037	0.045	-0.014
	0.009	0.001	-0.009	0.000	0.013	0.007	0.019	0.009	-0.007	0.008
	0.000	-0.015	-0.005	0.009	-0.014	0.005	-0.013	0.004	0.000	-0.003
	0.006	0.008	0.002	-0.007	-0.001	-0.006	0.004	-0.002	-0.001	0.002
	-0.003	-0.004	-0.001	0.005	-0.002	-0.002	0.000	0.003	-0.005	-0.005
	-0.002	-0.007	-0.003	-0.001	0.004					
NO. 9	0.210	0.065	-0.132	-0.106	0.069	-0.449	-0.253	-0.306	-0.302	-0.134
	-0.072	0.445	0.049	0.039	0.166	0.098	0.128	0.025	0.009	-0.080
	0.049	-0.056	-0.131	-0.112	0.007	-0.003	-0.033	0.005	0.007	-0.062
	-0.014	-0.017	0.007	0.121	0.157	0.027	0.239	-0.019	0.114	-0.017
	-0.026	-0.023	-0.027	-0.022	-0.003	-0.045	0.003	-0.019	-0.009	-0.032
	0.016	0.011	-0.038	-0.044	-0.054	0.027	0.010	-0.075	-0.033	-0.015
	-0.015	0.036	-0.005	0.016	0.022	-0.005	-0.016	0.030	0.007	0.030
	-0.005	0.010	0.030	0.004	0.002	0.048	-0.009	0.014	-0.003	0.018
	0.006	-0.001	0.026	-0.005	-0.006	-0.006	-0.006	-0.005	0.002	-0.005
	-0.003	0.002	-0.008	0.003	0.003	-0.006	-0.005	-0.001	-0.007	0.004
	0.003	0.001	-0.011	0.000	-0.003					
NO.10	-0.008	-0.009	-0.084	0.034	-0.294	-0.172	0.129	0.006	0.290	-0.210
	0.091	0.286	0.146	0.208	0.001	0.126	0.051	0.175	0.112	0.316
	0.119	0.130	0.447	0.029	-0.035	-0.093	0.025	-0.081	-0.080	0.000
	0.028	-0.099	-0.002	-0.054	0.066	-0.167	0.004	0.136	-0.023	0.091
	0.093	0.010	0.049	-0.005	0.040	0.039	-0.034	0.053	0.036	0.094
	0.020	0.046	0.058	0.065	0.096	-0.003	0.116	0.120	0.014	0.036
	0.004	-0.011	0.027	-0.014	-0.021	0.000	-0.030	-0.022	-0.005	-0.019
	0.016	0.021	-0.008	-0.028	0.017	-0.011	0.030	-0.010	0.007	-0.002
	-0.019	-0.013	-0.011	0.017	0.013	0.013	0.001	0.005	-0.002	0.000
	0.010	0.002	0.005	-0.010	-0.003	0.007	0.006	-0.002	0.012	0.005

	-0.002	0.012	0.013	0.002	0.001					
NO.11	-0.059	0.127	-0.084	0.024	0.022	-0.208	0.215	0.009	0.038	-0.305
	-0.053	-0.257	-0.076	0.087	-0.203	-0.009	-0.204	0.044	-0.398	0.053
	0.272	-0.148	0.000	-0.520	0.013	0.003	0.034	0.079	-0.027	0.033
	-0.075	-0.018	-0.006	-0.008	0.024	0.095	-0.026	0.015	0.022	-0.032
	-0.007	-0.075	0.000	-0.057	-0.040	-0.025	-0.017	-0.044	-0.081	0.009
	0.038	0.048	-0.041	-0.064	-0.006	0.110	0.055	-0.041	-0.130	-0.003
	-0.030	0.010	-0.010	0.014	0.001	-0.012	-0.005	0.006	0.020	0.007
	-0.017	0.003	0.016	0.013	0.009	0.006	0.000	0.004	-0.009	0.010
	0.007	-0.007	0.009	0.000	-0.014	-0.001	-0.010	-0.001	0.005	-0.005
	-0.003	0.008	-0.004	-0.001	0.009	-0.004	-0.007	-0.005	-0.001	0.006
	0.009	0.005	-0.007	0.000	-0.012					
NO.12	0.078	0.079	-0.061	-0.037	-0.029	0.327	0.282	-0.658	0.205	0.129
	-0.424	0.049	-0.054	0.018	-0.090	0.004	0.167	0.033	-0.049	-0.022
	0.006	0.066	-0.007	-0.028	-0.006	0.015	0.020	0.029	-0.065	0.090
	0.075	0.014	-0.209	0.050	0.044	0.001	-0.017	0.006	0.021	0.000
	-0.001	0.001	-0.011	-0.010	-0.001	0.009	-0.004	-0.021	-0.019	-0.007
	0.009	-0.004	0.041	-0.013	-0.010	0.009	0.006	-0.003	-0.005	-0.002
	-0.004	0.006	0.000	0.005	0.005	-0.001	-0.003	0.001	0.000	0.012
	-0.003	0.004	0.007	0.000	0.001	-0.003	0.003	0.004	-0.001	0.004
	0.001	-0.001	0.004	0.000	-0.001	-0.001	-0.001	-0.001	0.000	-0.001
	-0.001	0.001	-0.001	0.000	0.000	-0.002	-0.002	0.000	-0.001	0.001
	0.001	0.001	-0.001	0.000	-0.001					
NO.13	0.079	0.092	0.123	-0.035	-0.001	0.328	-0.572	-0.040	0.239	-0.460
	-0.037	-0.023	0.235	-0.067	-0.155	-0.178	-0.046	0.182	0.033	-0.124
	0.091	0.072	-0.084	-0.002	0.031	-0.094	0.052	0.053	-0.118	0.076
	-0.102	-0.120	-0.005	0.062	-0.033	-0.019	0.019	0.029	0.023	0.007
	-0.011	0.017	-0.022	-0.002	0.007	-0.016	-0.017	-0.027	0.021	-0.030
	-0.015	0.015	0.027	-0.011	-0.032	-0.004	-0.018	-0.022	0.001	-0.009
	-0.001	0.007	0.002	0.000	0.011	0.002	0.004	0.002	-0.001	0.013
	0.002	-0.007	0.000	-0.002	0.001	0.007	0.005	0.005	0.001	0.003
	0.002	0.000	0.006	-0.002	0.001	-0.003	0.000	-0.002	0.000	0.000
	-0.002	0.000	-0.002	0.002	0.000	-0.002	-0.001	0.000	-0.004	-0.001
	0.000	-0.002	-0.003	0.000	0.000					
NO.14	0.068	-0.102	-0.073	0.091	-0.142	-0.119	0.084	-0.188	-0.028	0.073
	0.256	-0.236	0.292	-0.302	0.117	0.175	-0.086	-0.038	-0.114	-0.364
	0.109	0.409	0.003	-0.021	0.105	0.012	-0.017	-0.217	-0.047	0.152
	-0.012	0.071	0.077	0.084	0.013	-0.083	-0.036	0.187	0.037	0.095
	0.018	-0.025	-0.072	-0.011	-0.001	-0.029	-0.063	-0.079	-0.029	-0.072
	0.025	0.091	0.120	-0.015	-0.032	0.014	0.043	0.021	-0.012	0.002
	-0.009	0.014	0.021	0.001	0.007	-0.004	-0.015	-0.015	0.005	0.026
	0.001	-0.002	0.007	-0.016	0.024	-0.003	0.043	0.008	0.005	0.009
	-0.008	-0.018	0.009	0.011	0.012	0.001	-0.003	-0.003	0.000	-0.003
	0.002	0.003	-0.003	-0.004	-0.001	-0.004	-0.001	-0.002	-0.002	0.004
	0.000	0.006	0.003	0.003	-0.002					
NO.15	0.148	-0.147	-0.064	-0.004	0.078	-0.341	-0.205	-0.235	0.392	0.162
	0.132	-0.354	-0.067	0.049	0.006	-0.146	0.235	0.042	0.223	0.048
	0.077	-0.306	0.001	-0.023	0.154	0.001	0.143	-0.041	0.102	0.152
	0.127	0.067	0.172	-0.018	-0.066	-0.065	-0.064	-0.051	-0.048	0.017
	-0.022	-0.015	0.000	-0.032	0.035	-0.040	0.031	0.005	0.039	-0.002
	0.042	-0.003	-0.117	0.012	0.009	0.011	-0.003	-0.010	-0.004	0.002
	0.002	-0.007	0.004	-0.008	-0.004	-0.004	0.011	-0.004	-0.001	-0.008
	0.008	-0.001	-0.009	-0.011	0.000	-0.008	-0.018	-0.006	0.001	-0.008
	-0.003	-0.003	-0.010	-0.001	0.001	0.001	0.001	0.001	0.000	0.001
	0.001	0.001	0.001	0.001	0.000	0.002	0.002	-0.001	0.002	-0.001
	0.000	-0.001	0.000	-0.001	0.000					

NO.16	-0.106	0.135	-0.008	0.091	-0.076	0.036	0.208	0.220	-0.109	-0.103
	-0.251	-0.067	-0.005	-0.263	0.058	-0.193	0.197	-0.106	0.442	-0.242
	0.169	-0.213	0.057	-0.159	0.071	-0.098	-0.098	0.005	-0.088	-0.057
	0.039	-0.038	-0.036	0.035	0.079	-0.258	0.110	0.103	0.127	0.175
	0.022	0.003	-0.045	-0.017	0.089	-0.081	0.006	0.030	0.106	-0.031
	0.059	0.042	-0.056	0.011	-0.018	0.058	0.113	-0.026	-0.038	0.008
	-0.029	0.034	0.039	-0.008	0.003	-0.010	-0.036	0.005	0.000	0.015
	0.028	0.025	0.017	-0.048	0.024	0.039	0.013	0.014	0.011	0.027
	-0.021	-0.036	0.033	0.015	0.018	0.003	-0.009	-0.004	0.000	-0.008
	0.007	0.009	-0.009	-0.005	0.000	-0.002	0.000	-0.007	0.000	0.012
	0.002	0.014	-0.006	0.002	-0.004					
NO.17	0.085	0.017	-0.061	0.174	0.059	-0.060	-0.183	-0.145	-0.030	-0.053
	-0.024	0.181	-0.346	-0.329	0.030	-0.103	-0.122	-0.084	-0.145	-0.274
	-0.026	-0.111	0.396	-0.008	-0.015	0.066	-0.043	0.165	0.056	-0.001
	-0.104	0.005	-0.025	-0.179	-0.068	0.000	-0.148	0.043	-0.276	0.071
	0.012	0.016	0.004	0.050	-0.012	0.028	0.000	0.014	-0.010	-0.021
	-0.027	-0.024	0.013	0.116	0.169	-0.018	0.059	0.211	0.023	0.081
	0.042	-0.061	0.014	-0.023	-0.048	0.010	-0.001	-0.045	-0.009	-0.061
	0.009	-0.002	-0.037	-0.006	0.001	-0.059	0.024	-0.052	0.012	-0.049
	-0.031	-0.007	-0.081	0.027	0.019	0.026	0.013	0.017	-0.003	0.011
	0.015	0.000	0.023	-0.014	-0.005	0.020	0.015	0.000	0.027	-0.004
	-0.004	0.008	0.035	0.002	0.003					
NO.18	0.008	-0.003	0.031	0.054	0.044	0.226	-0.171	0.042	0.036	-0.030
	0.025	-0.150	-0.256	-0.057	0.370	0.108	0.054	-0.011	-0.010	0.170
	-0.337	0.117	0.331	-0.241	0.063	0.080	0.130	-0.004	0.138	0.128
	-0.009	-0.036	0.036	0.149	0.198	0.061	0.125	0.011	0.285	-0.016
	-0.028	-0.034	-0.020	-0.052	-0.034	-0.022	0.020	-0.051	-0.045	-0.008
	-0.016	-0.039	-0.014	-0.075	-0.026	0.092	0.192	-0.033	-0.105	0.000
	-0.073	0.061	-0.007	0.033	0.024	-0.016	-0.034	0.030	0.022	0.055
	-0.017	0.025	0.056	0.010	0.010	0.046	-0.002	0.038	-0.012	0.063
	0.006	-0.015	0.073	0.007	-0.017	-0.001	-0.023	-0.008	0.006	-0.018
	0.001	0.009	-0.017	-0.007	0.009	-0.012	-0.013	-0.005	-0.005	0.020
	0.010	0.022	-0.015	0.001	-0.013					
NO.19	0.007	0.056	-0.026	0.021	0.000	-0.126	0.016	-0.037	-0.178	-0.065
	-0.089	-0.117	-0.156	-0.022	-0.388	-0.121	-0.215	0.024	-0.144	0.077
	0.011	-0.046	0.194	0.536	0.182	-0.001	0.075	0.019	0.034	0.123
	0.052	0.068	0.051	0.208	0.135	-0.115	0.143	0.009	0.262	0.099
	-0.021	-0.010	-0.041	-0.093	-0.017	-0.068	0.007	-0.062	-0.040	-0.016
	0.033	0.011	-0.037	0.012	-0.057	-0.112	0.083	-0.003	0.148	-0.007
	0.000	0.058	0.014	0.007	0.033	-0.006	-0.020	0.018	-0.009	0.060
	0.003	0.018	0.035	-0.023	0.010	0.043	-0.005	0.037	0.012	0.045
	-0.010	-0.007	0.061	0.005	0.022	-0.003	-0.001	-0.009	-0.006	-0.009
	0.005	-0.009	-0.013	-0.003	-0.011	-0.008	0.001	0.005	-0.009	0.008
	-0.010	0.009	-0.005	0.000	0.016					
NO.20	-0.027	-0.018	0.024	-0.128	-0.001	-0.028	0.091	0.032	-0.014	0.036
	0.037	0.011	-0.308	-0.307	0.196	-0.036	-0.086	0.756	-0.046	0.080
	0.075	0.032	-0.213	0.031	0.027	0.005	-0.090	-0.039	0.051	0.006
	0.131	-0.183	-0.046	-0.001	-0.012	-0.116	-0.025	-0.003	-0.021	0.069
	0.027	-0.008	0.012	-0.008	0.017	0.014	-0.015	0.021	-0.014	0.050
	0.012	-0.003	0.021	-0.005	-0.024	-0.003	-0.061	-0.037	0.027	-0.017
	0.011	-0.005	0.012	-0.009	0.001	-0.004	0.000	-0.004	-0.009	-0.002
	0.007	0.007	-0.011	-0.017	-0.002	-0.008	-0.001	0.000	0.006	-0.007
	-0.004	-0.008	-0.004	-0.004	0.012	-0.004	0.003	-0.001	-0.001	0.002
	-0.002	0.000	0.000	0.005	-0.002	0.000	0.000	-0.001	-0.003	-0.003
	-0.001	-0.007	-0.003	0.000	0.004					

****

*** OVERLAPS BETWEEN EIGENSTATES ***

	1	2	3	4	5	6	7	8
	9	10	11	12	13	14	15	16
	17	18	19	20				
1	1.0E+00	5.0E-09	2.8E-09	2.0E-09	-9.6E-09	-4.8E-10	-2.5E-09	4.6E-09
	2.2E-09	-3.4E-10	-2.5E-10	-7.6E-08	-8.8E-10	8.4E-09	3.7E-10	2.7E-09
	6.7E-10	-4.6E-10	1.5E-09	7.5E-09				
2	5.0E-09	1.0E+00	-2.7E-08	-2.2E-09	-3.6E-08	4.0E-10	-8.2E-09	1.3E-08
	4.1E-09	1.4E-09	-2.5E-09	-1.9E-07	-2.6E-09	1.9E-08	-1.8E-10	6.2E-09
	-4.8E-10	-1.7E-10	2.1E-09	3.0E-09				
3	2.8E-09	-2.7E-08	1.0E+00	1.6E-09	-4.2E-08	-2.8E-10	-8.5E-09	1.4E-08
	5.1E-09	5.7E-10	-1.9E-09	-2.0E-07	-2.6E-09	1.9E-08	3.3E-11	5.4E-09
	9.3E-11	-8.4E-10	2.5E-09	-1.9E-08				
4	2.0E-09	-2.2E-09	1.6E-09	1.0E+00	-8.3E-07	-1.2E-12	-1.5E-08	2.3E-08
	7.6E-09	1.4E-09	-3.2E-09	-2.8E-07	-3.6E-09	2.3E-08	-2.1E-10	6.4E-09
	-3.3E-10	-9.4E-10	2.8E-09	-3.3E-08				
5	-9.6E-09	-3.6E-08	-4.2E-08	-8.3E-07	1.0E+00	-1.4E-08	9.2E-09	-5.0E-09
	1.2E-08	-1.5E-08	1.1E-08	2.6E-08	2.7E-09	-1.0E-08	4.2E-09	-6.6E-09
	9.2E-09	-6.6E-09	5.4E-09	-1.1E-07				
6	-4.8E-10	4.0E-10	-2.8E-10	-1.2E-12	-1.4E-08	1.0E+00	6.8E-08	-3.7E-08
	-1.0E-08	-1.4E-09	2.5E-09	1.9E-07	2.2E-09	-3.8E-05	-3.9E-06	-2.2E-05
	-3.9E-06	-5.8E-06	-4.1E-06	-4.8E-04				
7	-2.5E-09	-8.2E-09	-8.5E-09	-1.5E-08	9.2E-09	6.8E-08	1.0E+00	2.4E-08
	3.3E-08	-1.8E-08	9.7E-09	-1.2E-07	4.4E-10	-1.2E-06	-1.2E-07	-7.1E-07
	-1.2E-07	-1.9E-07	-1.2E-07	-1.5E-05				
8	4.6E-09	1.3E-08	1.4E-08	2.3E-08	-5.0E-09	-3.7E-08	2.4E-08	1.0E+00
	-1.6E-07	5.6E-08	-2.6E-08	6.7E-08	-3.4E-09	1.8E-08	-4.7E-09	1.3E-08
	-1.1E-08	1.0E-08	-6.4E-09	2.6E-07				
9	2.2E-09	4.1E-09	5.1E-09	7.6E-09	1.2E-08	-1.0E-08	3.3E-08	-1.6E-07
	1.0E+00	3.4E-08	-1.7E-08	-3.6E-07	-6.0E-09	-1.9E-07	-2.4E-08	-1.2E-07
	-2.6E-08	-2.9E-08	-2.3E-08	-2.5E-06				
10	-3.4E-10	1.4E-09	5.7E-10	1.4E-09	-1.5E-08	-1.4E-09	-1.8E-08	5.6E-08
	3.4E-08	1.0E+00	9.0E-09	6.6E-07	7.1E-09	-1.4E-07	-1.2E-08	-7.2E-08
	-1.2E-08	-1.4E-08	-1.5E-08	-1.2E-06				
11	-2.5E-10	-2.5E-09	-1.9E-09	-3.2E-09	1.1E-08	2.5E-09	9.7E-09	-2.6E-08
	-1.7E-08	9.0E-09	1.0E+00	-1.1E-06	-9.2E-09	3.5E-08	1.9E-09	9.0E-09
	3.5E-09	-3.0E-09	5.6E-09	-2.4E-08				
12	-7.6E-08	-1.9E-07	-2.0E-07	-2.8E-07	2.6E-08	1.9E-07	-1.2E-07	6.7E-08
	-3.6E-07	6.6E-07	-1.1E-06	1.0E+00	8.4E-07	-2.1E-08	3.0E-07	-7.3E-08
	5.2E-07	-2.6E-07	2.9E-07	-2.8E-08				
13	-8.8E-10	-2.6E-09	-2.6E-09	-3.6E-09	2.7E-09	2.2E-09	4.4E-10	-3.4E-09
	-6.0E-09	7.1E-09	-9.2E-09	8.4E-07	1.0E+00	1.4E-08	4.5E-09	2.4E-09
	7.7E-09	-4.2E-09	5.3E-09	-9.8E-09				
14	8.4E-09	1.9E-08	1.9E-08	2.3E-08	-1.0E-08	-3.8E-05	-1.2E-06	1.8E-08
	-1.9E-07	-1.4E-07	3.5E-08	-2.1E-08	1.4E-08	1.0E+00	-1.5E-06	5.3E-08
	-2.9E-07	9.6E-08	-8.4E-08	8.5E-09				
15	3.7E-10	-1.8E-10	3.3E-11	-2.1E-10	4.2E-09	-3.9E-06	-1.2E-07	-4.7E-09
	-2.4E-08	-1.2E-08	1.9E-09	3.0E-07	4.5E-09	-1.5E-06	1.0E+00	7.2E-08
	1.6E-10	-3.8E-09	8.5E-09	-3.9E-08				
16	2.7E-09	6.2E-09	5.4E-09	6.4E-09	-6.6E-09	-2.2E-05	-7.1E-07	1.3E-08
	-1.2E-07	-7.2E-08	9.0E-09	-7.3E-08	2.4E-09	5.3E-08	7.2E-08	1.0E+00
	-2.5E-07	4.9E-08	-3.8E-08	1.5E-08				
17	6.7E-10	-4.8E-10	9.3E-11	-3.3E-10	9.2E-09	-3.9E-06	-1.2E-07	-1.1E-08
	-2.6E-08	-1.2E-08	3.5E-09	5.2E-07	7.7E-09	-2.9E-07	1.6E-10	-2.5E-07
	1.0E+00	-1.8E-08	2.9E-08	-1.0E-07				
18	-4.6E-10	-1.7E-10	-8.4E-10	-9.4E-10	-6.6E-09	-5.8E-06	-1.9E-07	1.0E-08
	-2.9E-08	-1.4E-08	-3.0E-09	-2.6E-07	-4.2E-09	9.6E-08	-3.8E-09	4.9E-08
	-1.8E-08	1.0E+00	-2.1E-08	7.6E-08				
19	1.5E-09	2.1E-09	2.5E-09	2.8E-09	5.4E-09	-4.1E-06	-1.2E-07	-6.4E-09
	-2.3E-08	-1.5E-08	5.6E-09	2.9E-07	5.3E-09	-8.4E-08	8.5E-09	-3.8E-08
	2.9E-08	-2.1E-08	1.0E+00	-1.3E-07				
20	7.5E-09	3.0E-09	-1.9E-08	-3.3E-08	-1.1E-07	-4.8E-04	-1.5E-05	2.6E-07

-2.5E-06 -1.2E-06 -2.4E-08 -2.8E-08 -9.8E-09 8.5E-09 -3.9E-08 1.5E-08
-1.0E-07 7.6E-08 -1.3E-07 1.0E+00

** C-TIME IN EIGLAN : 81.7 (SEC)

*** MATRIX ELEMENT OF F**2 ***

ST#	1	2	3	4	5	6
	7	8	9	10		
1	19.2206	0.3093	-1.1840	0.4667	0.2751	-0.5564
	-0.5877	-0.1709	-0.8592	-0.5335		
2	0.3093	18.6796	2.1422	-0.2092	-0.7735	-0.6485
	0.0785	-0.7976	0.1601	-0.5657		
3	-1.1840	2.1422	12.9649	-1.0318	1.7715	-0.1953
	-0.0398	-0.0355	0.0370	-0.1138		
4	0.4667	-0.2092	-1.0318	12.7287	-2.9273	-1.6188
	-0.0348	-1.3266	-0.2028	1.2244		
5	0.2751	-0.7735	1.7715	-2.9273	17.4558	-1.1353
	-0.4079	-0.4175	-0.5499	0.3243		
6	-0.5564	-0.6485	-0.1953	-1.6188	-1.1353	7.9515
	0.2238	-1.1223	-0.0072	-1.4178		
7	-0.5877	0.0785	-0.0398	-0.0348	-0.4079	0.2238
	11.8199	0.9286	0.0708	-0.7564		
8	-0.1709	-0.7976	-0.0355	-1.3266	-0.4175	-1.1223
	0.9286	13.9474	0.0579	-2.3463		
9	-0.8592	0.1601	0.0370	-0.2028	-0.5499	-0.0072
	0.0708	0.0579	12.8388	-1.1573		
10	-0.5335	-0.5657	-0.1138	1.2244	0.3243	-1.4178
	-0.7564	-2.3463	-1.1573	17.0718		

*** MATRIX ELEMENT OF ND ***

ST#		1	2	3	4	5	6
		7	8	9	10		
1	N	0.6605	-0.2581	0.3027	0.0003	-0.3553	0.0470
		0.1231	-0.0146	0.2262	0.0955		
	P	0.9247	-0.0504	-0.6501	0.2107	-0.2561	0.0533
		0.0093	-0.0088	0.0880	0.0220		
2	N	-0.2581	0.6276	0.0166	0.4056	0.1470	-0.1278
		0.1043	0.2342	0.0327	-0.1941		
	P	-0.0504	1.5102	0.2291	-0.5418	-0.3081	0.1542
		0.0969	0.1415	-0.0313	-0.2314		
3	N	0.3027	0.0166	0.8680	0.0853	0.1238	-0.1051
		-0.1190	-0.0252	0.0010	-0.1506		
	P	-0.6501	0.2291	0.7855	-0.5023	0.2783	0.1961
		-0.1694	-0.0457	0.3544	-0.0845		
4	N	0.0003	0.4056	0.0853	1.3339	0.2302	0.4817
		-0.0395	0.0472	0.2034	0.1609		
	P	0.2107	-0.5418	-0.5023	1.1089	-0.5718	-0.5786
		-0.0704	-0.3789	-0.4815	0.1699		
5	N	-0.3553	0.1470	0.1238	0.2302	0.8182	0.3158
		0.0130	0.0021	-0.4035	-0.0751		
	P	-0.2561	-0.3081	0.2783	-0.5718	2.1098	-0.3533
		0.0716	-0.2330	0.6018	0.0303		
6	N	0.0470	-0.1278	-0.1051	0.4817	0.3158	1.2291
		-0.0004	0.0780	0.0732	0.0214		
	P	0.0533	0.1542	0.1961	-0.5786	-0.3533	1.2027
		0.0320	-0.2323	-0.0330	-0.2965		
7	N	0.1231	0.1043	-0.1190	-0.0395	0.0130	-0.0004
		1.3932	-0.0674	0.0879	0.0734		

	P	0.0093	0.0969	-0.1694	-0.0704	0.0716	0.0320
		1.8329	0.1542	-0.0926	-0.1649		
8	N	-0.0146	0.2342	-0.0252	0.0472	0.0021	0.0780
		-0.0674	1.2013	-0.0154	0.1925		
	P	-0.0088	0.1415	-0.0457	-0.3789	-0.2330	-0.2323
		0.1542	2.1523	0.0506	-0.4984		
9	N	0.2262	0.0327	0.0010	0.2034	-0.4035	0.0732
		0.0879	-0.0154	1.2058	0.0370		
	P	0.0880	-0.0313	0.3544	-0.4815	0.6018	-0.0330
		-0.0926	0.0506	2.0973	-0.1855		
10	N	0.0955	-0.1941	-0.1506	0.1609	-0.0751	0.0214
		0.0734	0.1925	0.0370	0.8628		
	P	0.0220	-0.2314	-0.0845	0.1699	0.0303	-0.2965
		-0.1649	-0.4984	-0.1855	2.9595		

*** MATRIX ELEMENT OF (Q * Q) ***

ST#		1	2	3	4	5	6
		7	8	9	10		
1	N-N	10.0106	0.0455	-0.7913	-0.7060	-0.1241	-0.6284
		1.0750	-0.0101	0.4603	0.2661		
	P-P	44.1127	-4.4800	-8.4713	8.6137	-11.1153	0.1218
		-5.3894	-2.8303	-3.6523	-2.0002		
	N-P	11.8422	-2.1928	-2.4937	1.5046	-4.3582	0.7163
		1.0076	-0.1478	2.2240	0.8532		
2	N-N	0.0455	9.2745	-0.3115	-1.8939	-1.1900	-0.6079
		0.3243	0.4264	0.6247	0.5858		
	P-P	-4.4800	38.4714	2.5089	-2.2409	0.7049	0.2354
		3.6039	3.1271	-1.2150	-11.0849		
	N-P	-2.1928	9.0069	1.7369	-1.0070	-1.1799	0.1805
		1.4988	2.7915	-0.0165	-2.9738		
3	N-N	-0.7913	-0.3115	8.6582	-1.7109	0.1327	-0.4581
		-0.4579	-0.1536	-1.4142	-0.2794		
	P-P	-8.4713	2.5089	36.8394	-3.8703	1.0913	3.1837
		-6.3574	-3.0870	12.0861	-5.7214		
	N-P	-2.4937	1.7369	4.7171	-2.9543	2.8582	0.6828
		-2.2702	-0.5663	2.5529	-1.7414		
4	N-N	-0.7060	-1.8939	-1.7109	5.7423	-1.3706	-1.9940
		-0.4181	-0.6275	-1.1368	0.0475		
	P-P	8.6137	-2.2409	-3.8703	37.3290	-3.1810	-3.4895
		-0.2310	-3.9058	-2.5559	-0.9091		
	N-P	1.5046	-1.0070	-2.9543	5.2878	-2.4066	-0.6680
		-0.8026	-2.5051	-1.9792	2.2875		
5	N-N	-0.1241	-1.1900	0.1327	-1.3706	7.9719	-1.1306
		0.7709	-0.6123	2.3092	0.5518		
	P-P	-11.1153	0.7049	1.0913	-3.1810	41.1584	-1.3133
		1.5058	-1.7677	-0.6299	-5.5663		
	N-P	-4.3582	-1.1799	2.8582	-2.4066	8.5197	-0.2807
		0.7232	-1.7457	1.4208	-0.3363		
6	N-N	-0.6284	-0.6079	-0.4581	-1.9940	-1.1306	7.2650
		0.0433	-0.3807	0.1177	-1.1094		
	P-P	0.1218	0.2354	3.1837	-3.4895	-1.3133	32.9976
		0.3211	-0.1418	0.5807	1.6127		
	N-P	0.7163	0.1805	0.6828	-0.6680	-0.2807	0.0899
		0.2733	-1.3244	0.2753	-2.0788		
7	N-N	1.0750	0.3243	-0.4579	-0.4181	0.7709	0.0433
		6.6751	0.2283	-0.9428	-0.4347		
	P-P	-5.3894	3.6039	-6.3574	-0.2310	1.5058	0.3211
		43.8855	-2.0205	0.5413	0.2163		
	N-P	1.0076	1.4988	-2.2702	-0.8026	0.7232	0.2733
		6.2122	0.4983	-0.1495	-0.5756		

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8	N-N	-0.0101	0.4264	-0.1536	-0.6275	-0.6123	-0.3807
		0.2283	6.9099	0.2882	-0.8957		
	P-P	-2.8303	3.1271	-3.0870	-3.9058	-1.7677	-0.1418
		-2.0205	35.9608	-0.4473	0.0391		
	N-P	-0.1478	2.7915	-0.5663	-2.5051	-1.7457	-1.3244
		0.4983	5.7106	0.2450	-1.9161		
9	N-N	0.4603	0.6247	-1.4142	-1.1368	2.3092	0.1177
		-0.9428	0.2882	6.9834	-0.2426		
	P-P	-3.6523	-1.2150	12.0861	-2.5559	-0.6299	0.5807
		0.5413	-0.4473	39.7536	-0.0036		
	N-P	2.2240	-0.0165	2.5529	-1.9792	1.4208	0.2753
		-0.1495	0.2450	4.3059	-1.0652		
10	N-N	0.2661	0.5858	-0.2794	0.0475	0.5518	-1.1094
		-0.4347	-0.8957	-0.2426	7.7341		
	P-P	-2.0002	-11.0849	-5.7214	-0.9091	-5.5663	1.6127
		0.2163	0.0391	-0.0036	38.4045		
	N-P	0.8532	-2.9738	-1.7414	2.2875	-0.3363	-2.0788
		-0.5756	-1.9161	-1.0652	7.1246		

CPU-TIME : 104 (SEC) FINISHED AT 11:23:01

NPBOS VERSION : MAR-85 / LOS ALAMOS-TOKAI / TAKA OTSUKA

```
**************************************************************
***      2 - NEUTRON BOSONS          6 - PROTON BOSONS       ***
***              F*F (MAX) =  20.00                          ***
***              BINDING ENERGY =   0.6327 (MEV)             ***
**************************************************************
```

NO.	J	P		EXC (MEV)	EXPERIMENT	RATIO	F*F / MAX
1	0	+	(1)	0.000	0.000	0.000	96.2
2	2	+	(1)	0.563	0.550	1.000	96.1
3	0	+	(2)	1.420	1.426	2.523	97.0
4	2	+	(2)	1.519	1.454	2.699	93.4
5	2	+	(3)	1.635	1.664	2.904	64.8
6	0	+	(3)	2.256		4.009	56.6
7	2	+	(4)	2.344		4.165	63.6
8	2	+	(5)	2.379		4.227	87.3
9	0	+	(4)	2.637		4.685	96.8
10	2	+	(6)	3.077		5.467	39.8
11	2	+	(7)	3.139		5.576	59.1
12	2	+	(8)	3.277		5.822	69.7
13	2	+	(9)	3.341		5.936	64.2
14	2	+	(10)	3.488		6.196	85.4
15	2	+	(11)	3.660		6.502	
16	2	+	(12)	3.844		6.829	
17	2	+	(13)	3.906		6.940	
18	2	+	(14)	4.306		7.649	
19	2	+	(15)	4.316		7.668	
20	2	+	(16)	4.381		7.783	
21	2	+	(17)	4.420		7.852	
22	2	+	(18)	4.502		7.997	
23	2	+	(19)	4.584		8.143	
24	2	+	(20)	4.787		8.504	

```
$ASS SU3HMLT.DAT FOR003
$ASS RAC6.DAT FOR009
$ASS DDMEFL.DAT FOR010
$ASS CFP2.DAT FOR011
$ASS SU3VEC.DAT FOR020
$ASS SU3SEBL.DAT FOR013
$ASS SU3IVEC.DAT FOR014
$ASS OUT2SU3.DAT FOR008
$ASS OUTSU3.DAT FOR006
$RUN NPBOS
 $N  NCUT=30,   IEX=2,
     LAUTO= 0, 2, 4, 1, 6, 3, -5,  -1,
     NEIGA= 3, 6, 5, 2, 3, 2, 2,
     IWCF=1,  NPSTW=0,
 $END
    SU
    2    4
   11
    0 + 1  0.0
    2 + 1  0.225
    4 + 1  0.750
    6 + 1  1.575
    8 + 1  2.700
    0 + 2  3.300
    2 + 2  3.225
    2 + 3  3.525
    1 + 1  3.075
    3 + 1  3.450
    3 + 2  3.750
 $INPT
      ISU3 =  1,
      RKAP = -0.200,
      RMAJ =  0.400,
 $END

E
$DEL SU3SEBL.DAT.*
$DEL SU3IVEC.DAT.*
$ASS SU3VC30.DAT FOR030
$ASS BT2SU3.DAT FOR008
$ASS BTSU3.DAT FOR006
$RUN NPBTRN.EXE
 2
 5
 2 1   0 1   0.1800
 4 1   2 1   0.242857
 6 1   4 1   0.239161
 2 1   2 1   -0.86477
 0 1   2 1    0.90000
 0.100    0.100
    2    0
    0    2
    2    2
    4    2
    6    4
    3    2
    1    2
   -1   -1
 1
 2
 2 1   2 1 *
 0 1   1 1 *
```



```
 0.100    0.100
    2    2
    0    1
   -1   -1
-1
$DEL SU3VC*.DAT.*
$DEL SU3HML*.DAT.*
```

```
  *----------*
  *          *
  *    SU    *
  *----------*

***  PARAMETERS  IN  THE  HAMILTONIAN  ***

   RKAP : -0.200     HEX  :  0.000     EFIX :  0.000
   CHN  :  0.000     CHP  :  0.000
   RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
   ED   :  0.000     EDN  :  0.000     EDP  :  0.000
   MAJ  :  0.400     S-D  :  0.000     J=1 : 0.000     J=3 : 0.000
   RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 1

DATE : 29-MAR-85     TIME :  10:23:00

CPU-TIME :      22 (SEC)        FINISHED AT 10:23:30

NPBOS VERSION : MAR-85 / LOS ALAMOS-TOKAI / TAKA OTSUKA

*****************************************************************
***      2 - NEUTRON BOSONS          4 - PROTON BOSONS        ***
***              F*F (MAX) =  12.00                           ***
***              BINDING ENERGY =   9.0000 (MEV)              ***
*****************************************************************
```

NO.	J	P	EXC (MEV)	EXPERIMENT	RATIO	F*F / MAX
1	0	+ (1)	0.000	0.000	0.000	100.0
2	2	+ (1)	0.225	0.225	1.000	100.0
3	4	+ (1)	0.750	0.750	3.333	100.0
4	6	+ (1)	1.575	1.575	7.000	100.0
5	1	+ (1)	3.075	3.075	13.667	50.0
6	2	+ (2)	3.225	3.225	14.333	50.0
7	0	+ (2)	3.300	3.300	14.667	100.0
8	3	+ (1)	3.450	3.450	15.333	50.0
9	2	+ (3)	3.525	3.525	15.667	100.0
10	4	+ (2)	3.750		16.667	50.0
11	3	+ (2)	3.750	3.750	16.667	100.0
12	4	+ (3)	4.050		18.000	100.0
13	0	+ (3)	4.500		20.000	50.0
14	6	+ (2)	4.575		20.333	50.0
15	2	+ (4)	4.725		21.000	50.0

16	6	+ (3)	4.875	21.667	100.0
17	4	+ (4)	5.250	23.333	50.0
18	2	+ (5)	5.525	24.556	16.7
19	2	+ (6)	5.625	25.000	100.0
20	1	+ (2)	5.775	25.667	50.0
21	4	+ (5)	6.050	26.889	16.7

```
*----------*
*          *
*      SU  *
*----------*

TRANSITION : E 2

DATE : 29-MAR-85      TIME : 10:23:34

     INPUT-FILE -->   DATE : 29-MAR-85      TIME : 10:23:00

EXPERIMENTAL  DATA     (# OF DATA =  5)

      INITIAL          FINAL          B(EL OR ML)       ERROR
       J   (#)          J   (#)
       2 (  1)          0 (  1)          0.1800         0.0000
       4 (  1)          2 (  1)          0.2429         0.0000
       6 (  1)          4 (  1)          0.2392         0.0000
       2 (  1)          2 (  1)         -0.8648         0.0000
       0 (  1)          2 (  1)          0.9000         0.0000

          DATA WITH * IS SUPPOSED TO BE MOMENT OR G-FACTOR

BOSON  TRANSITION  PARAMETERS

                       NEUTRON          PROTON

BOSON  CHARGE           0.100            0.100

CHI (DS / DD)          -1.323           -1.323       SAME  AS  IN  QQ-INT

*** CALCULATED  &  EXPERIMENTAL  E 2  MATRIX  ELEMENTS  (OR  B(EL OR ML)'S) ***

            * ON LAST COLUMN INDICATES MOMENT OR G-FACTOR  (M1 = G*L(TOT))
            @ ON LAST COLUMN INDICATES EXPERIMENTAL DATA

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

 2 (1)  0 (1)    2.204   -0.724    4.408   -1.449 *   3.162    6.325 *      0.1800
                                                       EXP DATA -->      0.1800 @
                                                           ( ERROR =     0.0000 )
                                                       EXP DATA -->      0.1800 @
                                                           ( ERROR =     0.0000 )

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

 0 (1)  2 (1)    2.204   -0.724    4.408   -1.449 *   3.162    6.325 *      0.9000
                                                       EXP DATA -->      0.9000 @
                                                           ( ERROR =     0.0000 )
                                                       EXP DATA -->      0.9000 @
                                                           ( ERROR =     0.0000 )

*************************************************************************
```



```
 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

 2 (1)  2 (1)   -2.561    0.939   -5.122    1.878 *  -3.803   -7.606 *     -0.8648 *
                                                       EXP DATA -->     -0.8648 @
                                                           ( ERROR =     0.0000 )

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

 4 (1)  2 (1)   -3.435    1.129   -6.869    2.258 *  -4.928   -9.856 *      0.2429
                                                       EXP DATA -->      0.2429 @
                                                           ( ERROR =     0.0000 )

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

 6 (1)  4 (1)    4.096   -1.346    8.193   -2.693 *   5.878   11.755 *      0.2392
                                                       EXP DATA -->      0.2392 @
                                                           ( ERROR =     0.0000 )

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

*************************************************************************

 LI     LF      DS (N)   DD (N)   DS (P)   DD (P)  NEUTRON   PROTON    B(E2;LI->LF)

*************************************************************************
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*----------*
*          *
*      SU  *
*----------*

TRANSITION : M 1

DATE : 29-MAR-85     TIME : 10:23:34

     INPUT-FILE -->   DATE : 29-MAR-85     TIME : 10:23:00

EXPERIMENTAL  DATA    (# OF DATA =  2)

      INITIAL        FINAL         B(EL OR ML)       ERROR
       J  (#)        J  (#)
       2 ( 1)        2 ( 1)       NO DATA (CALCULATED IN ILIST=0 MODE)
       0 ( 1)        1 ( 1)       NO DATA (CALCULATED IN ILIST=0 MODE)

          DATA WITH * IS SUPPOSED TO BE MOMENT OR G-FACTOR

BOSON  TRANSITION  PARAMETERS

                     NEUTRON        PROTON

BOSON  CHARGE         0.100          0.100

   M 1  -->  THESE ARE BOSON G-FACTORS

*** CALCULATED  &  EXPERIMENTAL  M 1  MATRIX  ELEMENTS  (OR  B(EL OR ML)'S) ***

           * ON LAST COLUMN INDICATES MOMENT OR G-FACTOR  (M1 = G*L(TOT))
           @ ON LAST COLUMN INDICATES EXPERIMENTAL DATA

*******************************************************************************

 LI     LF      DS (N)  DD (N)   DS (P)  DD (P)  NEUTRON  PROTON   B(M1;LI->LF)

 2 (1)  2 (1)    0.000   0.577    0.000   1.155 *   0.333   0.667 *     0.1000 *

*******************************************************************************

 LI     LF      DS (N)  DD (N)   DS (P)  DD (P)  NEUTRON  PROTON   B(M1;LI->LF)

 0 (1)  1 (1)    0.000  -0.763    0.000   0.763 *  -1.179   1.179 *     0.0000
```



```
**********   N P B O S   C A L C U L A T I O N    (VERSION R)   **********
*                                                                          *
*              VERSION   MAR  29  1985   //   LOS ALAMOS-TOKAI            *
*                                                                          *
*              DATE : 29-MAR-85    TIME : 10:23:00                         *
*                                                                          *
****************************************************************************

 # CFP FILE (#11) READ-IN   REQUIRED MAX(ND) =11
          / MAX(ND) ON FILE =11 (IF FORMER > LATTER, LATTER BE TAKEN)

 **  D-D M.E.  INPUT  FROM  FILE-10  **
     MAXDD =     8     NDBST =   105     NMEDD =    1780     PRINT = 1

*----------*
*          *
*      SU  *
*----------*

  **  EXPERIMENTAL  SPECTRUM   (# OF DATA =  11 )
        SPIN            EXP. ENERGY (MEV)
        0 +    (1)        0.00000
        2 +    (1)        0.22500
        4 +    (1)        0.75000
        6 +    (1)        1.57500
        8 +    (1)        2.70000
        0 +    (2)        3.30000
        2 +    (2)        3.22500
        2 +    (3)        3.52500
        1 +    (1)        3.07500
        3 +    (1)        3.45000
        3 +    (2)        3.75000

***  PARAMETERS  IN  THE  HAMILTONIAN  ***

 RKAP : -0.200     HEX  :  0.000     EFIX :  0.000
 CHN  :  0.000     CHP  :  0.000
 RLNN :  0.000     RLPP :  0.000     RLNP :  0.000
 ED   :  0.000     EDN  :  0.000     EDP  :  0.000
 MAJ  :  0.400     S-D  :  0.000     J=1 : 0.000     J=3 : 0.000
 RKNN :  0.000     RKPP :  0.000     ISU3(1/0) : 1
```

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*****   P R O B L E M   *****

      UPPER  LIMIT  OF  TOTAL    D-BOSON  #  =  6
      .....  .....  ..  NEUTRON  .......  .  =  2
      .....  .....  ..  PROTON   .......  .  =  4
      TOTAL  NEUTRON  BOSON  #  =  2
      .....  PROTON   .....  .  =  4

      TOTAL  ANGULAR  MOMENTUM  =  0


    NUM  OF  STATES  =   22

    # OF M.E. =     123     NON-ZERO / TRI-ANGLE = 48.6 (%)
    FILE ACCESS (#3) =     0 (/19.1KB)     LOGICAL =   0


         **  C-TIME  IN  BSYSME  :    0.1  (SEC)


*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

        EIG =   -8.68078  -3.86561   0.21444
        EIG =   -8.94848  -4.83200  -2.07245
        EIG =   -8.99649  -5.50054  -3.24495
        EIG =   -8.99981  -5.65427  -3.62511
        EIG =   -8.99999  -5.68708  -3.90931
        EIG =   -9.00000  -5.69778  -4.28540
        EIG =   -9.00000  -5.69995  -4.49033
        EIG =   -9.00000  -5.70000  -4.49996

      ******  CONVERGED  AT  EIG(  1) =    -9.0000  ******

        EIG =   -9.00000  -5.70000  -4.50000
        EIG =   -9.00000  -5.70000  -4.50000

      ******  CONVERGED  AT  EIG(  2) =    -5.7000  ******

        EIG =   -9.00000  -5.70000  -4.50000
****  TRUNCATED  AT  N = 14      A =   -1.848      B2= 0.46E-13
        EIG =   -9.00000  -5.70000  -4.50000
*************************************************************************
***                                                                   ***
***   J =  0     DIM =   22     BE =  9.000                           ***
***                                                                   ***
***   TRUNCATION  :  TOTAL =  6     NEUTRON =  2     PROTON =  4     ***
***                                                                   ***
      EIG       :   -9.000   -5.700   -4.500
***                                                                   ***
      EIG + BE  :    0.000    3.300    4.500
***                                                                   ***
*************************************************************************

   ************************************************
    PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
   ************************************************
          ND    0   1   2   3   4   5   6
    ST. #
   ------------------------------------------------
       1         2   0  21  16  37  18   6
```



```
       2        15   0  36   4   3  21  21
       3         0   0  24  21  42  13   0
************************************************

*************************************************************************************
          WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                              FIRST   10  AMPLITUDES  ARE  PRINTED
                              TOTAL  DIMENSION  =    22

ND(TOT)   0      2      2      2      3      3      3      4      4      4
ND (N)    0      2      1      0      2      1      0      2      2      2
L  (N)    0      0      2      0      2      2      0      0      2      4
ND (P)    0      0      1      2      1      2      3      2      2      2
L  (P)    0      0      2      0      2      2      0      0      2      4
-------------------------------------------------------------------------------------
NO. 1  -0.134 -0.119 -0.338 -0.293  0.181  0.313  0.181 -0.262 -0.167 -0.224

NO. 2   0.385  0.155  0.438  0.379 -0.091 -0.158 -0.091 -0.075 -0.048 -0.065

NO. 3   0.000 -0.285 -0.202  0.350  0.324  0.000 -0.324 -0.313 -0.200 -0.268
*************************************************************************************


***  OVERLAPS  BETWEEN  EIGENSTATES  ***
        1         2         3
 1    1.0E+00   1.1E-08  -2.0E-09
 2    1.1E-08   1.0E+00  -1.2E-08
 3   -2.0E-09  -1.2E-08   1.0E+00

       **  C-TIME  IN  EIGLAN  :    1.0  (SEC)


 ***  MATRIX  ELEMENT  OF  F**2  ***
  ST#          1          2          3

    1      12.0000     0.0000     0.0000
    2       0.0000    12.0000     0.0000
    3       0.0000     0.0000     6.0000


 ***  MATRIX  ELEMENT  OF  ND  ***
  ST#            1          2          3

    1  N       1.2121     0.4205     0.5579
       P       2.4242     0.8411    -0.5579
    2  N       0.4205     1.0926    -0.0919
       P       0.8411     2.1853     0.0919
    3  N       0.5579    -0.0919     1.0714
       P      -0.5579     0.0919     2.3571


 ***  MATRIX  ELEMENT  OF  ( Q * Q )  ***
  ST#            1          2          3

    1  N-N    11.8182    -0.7570    -0.6276
       P-P    41.8182    -0.7570    -0.6276
       N-P    18.1818     0.7570     0.6276
    2  N-N    -0.7570     9.8332    -3.2132
       P-P    -0.7570    28.8332    10.0532
       N-P     0.7570     9.1668    -3.4200
    3  N-N    -0.6276    -3.2132     7.5536
       P-P    -0.6276    10.0532    35.0536
```

```
N-P     0.6276    -3.4200     7.1964
```



```
*****   P R O B L E M   *****

        UPPER  LIMIT  OF  TOTAL     D-BOSON  #  =  6
        .....  .....  ..  NEUTRON  .......  .  =  2
        .....  .....  ..  PROTON   .......  .  =  4
        TOTAL  NEUTRON  BOSON  #  =  2
        .....  PROTON   .....  .  =  4

        TOTAL  ANGULAR  MOMENTUM  =  2


    NUM  OF  STATES  =   51

    **  FILE-9  READ-IN : MAX(ND) = 6   MAX(LT) =  8   CALC.  DATE = 4-MAR-85

    # OF M.E. =     630     NON-ZERO / TRI-ANGLE = 47.5 (%)
    FILE ACCESS (#3) =     0 (/19.1KB)     LOGICAL =   0

         **  C-TIME  IN  BSYSME  :    0.8  (SEC)

*****   DIAGONALIZATION  OF  HAMILTONIAN   *****

        EIG =   -8.76478  -5.45176  -3.33280  -1.47059   0.28281   1.58521
        EIG =   -8.77422  -5.47034  -3.53802  -2.23697  -0.87342   0.49760
        EIG =   -8.77495  -5.47699  -3.96170  -3.10940  -1.50290  -0.08452
        EIG =   -8.77500  -5.47978  -4.43816  -3.38344  -2.25158  -1.21298
        EIG =   -8.77500  -5.48270  -4.99300  -3.80523  -3.13333  -1.78160
        EIG =   -8.77500  -5.72594  -5.47382  -4.24302  -3.35272  -2.36339
        EIG =   -8.77500  -5.77378  -5.47497  -4.27324  -3.37208  -2.47830

      ******  CONVERGED  AT  EIG(  1) =    -8.7750  ******

        EIG =   -8.77500  -5.77492  -5.47500  -4.27472  -3.37390  -2.50296
        EIG =   -8.77500  -5.77500  -5.47500  -4.27495  -3.37465  -2.59425
        EIG =   -8.77500  -5.77500  -5.47500  -4.27499  -3.37502  -2.83739
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.37530  -3.01959
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.37555  -3.15371

      ******  CONVERGED  AT  EIG(  2) =    -5.7750  ******

        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.37579  -3.23742
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.40125  -3.37332

      ******  CONVERGED  AT  EIG(  3) =    -5.4750  ******

        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.46047  -3.37488
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47479  -3.37500

      ******  CONVERGED  AT  EIG(  4) =    -4.2750  ******

        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47498  -3.37500
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47500  -3.37500
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47500  -3.37500
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47500  -3.37500
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47500  -3.37500

      ******  CONVERGED  AT  EIG(  5) =    -3.4750  ******
```

```
****  TRUNCATED  AT  N = 27      A =   -0.841      B2= 0.27E-05
        EIG =   -8.77500  -5.77500  -5.47500  -4.27500  -3.47500  -3.37500
*****************************************************************
***                                                           ***
***   J =  2      DIM =   51      BE =  9.000                 ***
***                                                           ***
***   TRUNCATION  :  TOTAL =  6      NEUTRON =  2      PROTON =  4    ***
***                                                           ***
      EIG       :    -8.775    -5.775    -5.475    -4.275    -3.475    -3.375
***                                                           ***
      EIG + BE  :     0.225     3.225     3.525     4.725     5.525     5.625
***                                                           ***
*****************************************************************
```

```
***********************************************
 PROBABILITY (%)  IN  VARIOUS  D-CONFIGURATIONS
***********************************************
        ND    0   1   2   3   4   5   6
 ST. #
-----------------------------------------------
    1         0   5   8  31  28  23   6
    2         0   2   1  30  25  32   9
    3         0   8   4  15  46  14  13
    4         0   1   7  23  31  29   9
    5         0   0   1  17  27  40  15
    6         0  26  23   1  10   1  39
***********************************************
```

```
*************************************************************************
          WAVE  FUNCTIONS  :  FIRST   10  COMPONENTS  ARE  LABELLED
                              FIRST   10  AMPLITUDES  ARE  PRINTED
                              TOTAL  DIMENSION  =    51

ND(TOT)   1      1      2      2      2      3      3      3      3      3
ND  (N)   1      0      2      1      0      2      2      2      1      1
L   (N)   2      0      2      2      0      0      2      4      2      2
ND  (P)   0      1      0      1      2      1      1      1      2      2
L   (P)   0      2      0      2      2      2      2      2      0      2
-------------------------------------------------------------------------
NO. 1  -0.134 -0.189  0.071  0.202  0.175 -0.169 -0.108 -0.145 -0.293 -0.187

NO. 2   0.125 -0.089 -0.067 -0.047  0.082 -0.079  0.025  0.272  0.274  0.044

NO. 3  -0.162 -0.229 -0.054 -0.153 -0.133 -0.119 -0.076 -0.102 -0.207 -0.132

NO. 4   0.086 -0.061  0.157  0.111 -0.192 -0.091  0.224  0.029  0.220 -0.348

NO. 5   0.000  0.000 -0.087  0.061 -0.035 -0.103 -0.230  0.248 -0.030 -0.114

NO. 6   0.297  0.420  0.123  0.348  0.302  0.035  0.023  0.030  0.061  0.039
*************************************************************************
```

```
***  OVERLAPS  BETWEEN  EIGENSTATES  ***
        1          2          3          4          5          6
 1   1.0E+00 -9.5E-09 -2.9E-08  1.0E-08 -8.2E-10  2.0E-08
 2  -9.5E-09  1.0E+00 -1.3E-06  1.1E-07 -8.6E-09  1.9E-07
 3  -2.9E-08 -1.3E-06  1.0E+00 -6.5E-08 -2.9E-09  1.3E-08
 4   1.0E-08  1.1E-07 -6.5E-08  1.0E+00  6.7E-09 -1.2E-07
 5  -8.2E-10 -8.6E-09 -2.9E-09  6.7E-09  1.0E+00 -2.8E-08
 6   2.0E-08  1.9E-07  1.3E-08 -1.2E-07 -2.8E-08  1.0E+00
```



```
    **  C-TIME  IN  EIGLAN  :    3.9  (SEC)
```

```
***  MATRIX  ELEMENT  OF  F**2  ***
 ST#        1          2          3          4          5          6
  1    12.0000     0.0000     0.0000     0.0000     0.0000     0.0000
  2     0.0000     6.0000     0.0000     0.0000     0.0000     0.0000
  3     0.0000     0.0000    12.0000     0.0000     0.0000     0.0000
  4     0.0000     0.0000     0.0000     6.0000     0.0000     0.0000
  5     0.0000     0.0000     0.0000     0.0000     2.0000     0.0000
  6     0.0000     0.0000     0.0000     0.0000     0.0000    12.0000
```

```
***  MATRIX  ELEMENT  OF  ND  ***
 ST#          1          2          3          4          5          6
  1  N     1.2424    -0.1421    -0.1345     0.0600     0.0000     0.0000
     P     2.4848     0.1421    -0.2691    -0.0600     0.0000     0.0000
  2  N    -0.1421     1.5111    -0.0252    -0.0085     0.1664     0.0000
     P     0.1421     2.6000     0.0252    -0.0536    -0.1664     0.0000
  3  N    -0.1345    -0.0252     1.3078    -0.1860     0.0000     0.3882
     P    -0.2691     0.0252     2.6156     0.1859     0.0000     0.7764
  4  N     0.0600    -0.0085    -0.1860     1.4726    -0.1265     0.1055
     P    -0.0600    -0.0536     0.1859     2.5814     0.1265    -0.1055
  5  N     0.0000     0.1664     0.0000    -0.1265     1.8899     0.0000
     P     0.0000    -0.1664     0.0000     0.1265     2.6224     0.0000
  6  N     0.0000     0.0000     0.3882     0.1055     0.0000     1.1730
     P     0.0000     0.0000     0.7764    -0.1055     0.0000     2.3459
```

```
***  MATRIX  ELEMENT  OF  ( Q * Q )  ***
 ST#          1          2          3          4          5          6
  1  N-N   11.6136     0.9594     0.2422    -0.0675     0.7052     0.0000
     P-P   40.8636    -2.2386     0.2422    -0.0675     0.7052     0.0000
     N-P   17.6364     0.6396    -0.2422     0.0675    -0.7052     0.0000
  2  N-N    0.9594     9.8000     0.1634    -0.1755    -0.6911     0.0000
     P-P   -2.2386    39.0500    -0.3767     0.4947     2.4042     0.0000
     N-P    0.6396    10.4500     0.1066    -0.1596    -0.8565     0.0000
  3  N-N    0.2422     0.1634     9.2960     3.7357    -0.5983    -0.6988
     P-P    0.2422    -0.3767    27.5460   -10.3702    -0.5983    -0.6988
     N-P   -0.2422     0.1066     8.9540     3.3173     0.5983     0.6988
  4  N-N   -0.0675    -0.1755     3.7357     6.5323     1.8086    -0.1187
     P-P   -0.0675     0.4947   -10.3702    34.0518    -2.4700    -0.1187
     N-P    0.0675    -0.1596     3.3173     7.0829     0.3307     0.1187
  5  N-N    0.7052    -0.6911    -0.5983     1.8086     7.2824     0.2886
     P-P    0.7052     2.4042    -0.5983    -2.4700    38.7029     0.2886
     N-P   -0.7052    -0.8565     0.5983     0.3307     4.3824    -0.2886
  6  N-N    0.0000     0.0000    -0.6988    -0.1187     0.2886     8.1387
     P-P    0.0000     0.0000    -0.6988    -0.1187     0.2886    19.3887
     N-P    0.0000     0.0000     0.6988     0.1187    -0.2886     3.1113
```

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