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Erratum: Evidence for radiative coupling of the pygmy dipole resonance to excited states [Phys. Rev. C 86, 051302(R) (2012)]

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In our original paper, a significant pileup correction was performed on the data which was not explained due to space constraints. The general pileup function method was used [1], which enables an accurate pileup correction in the presence of a large low-energy background even when a threshold is applied to the data. In the present case, since a spectrum with no threshold applied was not available, the general pileup function was modeled as an exponential which was truncated at 511 keV, and the parameters were allowed to vary in a fit to each experimental spectrum. The fit of the pileup amount was performed simultaneously with the fit of the ground-state strength. The counts present at energies in excess of the beam energy provided a constraint for the pileup amount. We realized after publication that the pileup amount as a fraction of the total counts is actually a factor of 0.5 that of the fit value as explained in Ref. [1]. Our original paper used the fit values directly. Correcting the pileup amount has the effect of decreasing the measured ^{142}Nd photoelastic cross sections between 1% and 13%. The branching ratios are only slightly affected. The new cross sections are given in Table I.

Expanded information is also warranted on how we differentiated the full-energy elastic-scattering strength from the other components of the detector response. The elastic-scattering counts were extracted using an empirical detector response function (see Fig. 1 in the original paper). The complementary error function was used to model the multiscatter Compton continuum component of the response function [2]. It is the only significant component that interferes with the extraction of the elastic-scattering counts. It was calibrated using data from the nuclear resonance fluorescence of ^{11}B.

We have also realized that the level density has a significant effect on the determined strength of the component built only on excited states. We originally used only a single level density parametrization. The backshifted Fermi gas model was used [3] and was fitted to the data, reproducing only the two highest-energy data points ($E_\gamma \geqslant 9.45$ MeV). Final parameters were $a = 15.8$ (level density parameter) and $E_1 = 1.36$ (the energy backshift). This was performed because the level density for ^{142}Nd is not yet experimentally determined. Nearby ^{138}Ba has an experimentally determined level density parameter of $a = 12.39 \pm 0.39$, and $E_1 = 1.12 \pm 0.22$. Using this lower value of a significantly increases the calculated average branching ratios $\langle b_0 \rangle$ at high energies for a given photon strength function but leaves $\langle b_0 \rangle$ at low energies largely unaffected. Thus lowering the level density parameter to $a = 12.39$ increases the size of the resonance strength needed to be built on excited states to explain the present data by a factor of 5. The requirement that the additional strength is built only on excited states above $E_x \gtrsim 4.7$ MeV is preserved. Lowering the level density (decreasing a), however, increases the upper limit of the region of states which can be built on. When using $a = 12.39$, the upper limit is effectively removed.

TABLE I. Updated cross sections for ^{142}Nd with branching ratios.

E_γ (MeV)	$\sigma_{\gamma T}$ (mb)	$\langle b_0 \rangle$
4.13	0.08 ± 0.01	1.00 ± 0.28
4.64	0.30 ± 0.02	0.68 ± 0.02
4.95	0.44 ± 0.03	1.00 ± 0.18
5.22	1.0 ± 0.1	1.00 ± 0.10
5.44	1.5 ± 0.1	1.00 ± 0.05
5.59	2.4 ± 0.2	0.81 ± 0.03
5.77	2.5 ± 0.2	0.88 ± 0.05
5.97	6.8 ± 0.4	0.83 ± 0.01
6.22	9.3 ± 0.5	0.90 ± 0.01
6.60	12.6 ± 0.7	0.70 ± 0.01
6.89	14.9 ± 0.8	0.67 ± 0.01
7.19	16.0 ± 0.9	0.66 ± 0.01
7.66	27.6 ± 1.5	0.67 ± 0.01
8.17	21.5 ± 1.2	0.51 ± 0.01
8.71	21.2 ± 1.1	0.37 ± 0.01
9.18		0.29 ± 0.02
9.45		0.32 ± 0.01
9.68		0.26 ± 0.01

To summarize, the main conclusion of the paper remains unchanged, only the cross sections have been modestly reduced as a result of a correction in the pileup amount. The data still conclusively support a significant strength in the low-energy photon strength function that is built only on excited states at $E_x \gtrsim 4.7$ MeV. The presence of this strength violates the Brink-Axel hypothesis and may be a transition between different modes of the pygmy dipole resonance.

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