Errata

Constraints on the low-energy $E1$ cross section of $^{12}C(\alpha,\gamma)^{16}O$ from the β-delayed α spectrum of ^{16}N [Phys. Rev. C 50, 1194 (1994)]

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The paper cited above omitted the explanation of our energy calibration of the ^{16}N β-delayed α spectrum sent to us by Professor H. Wäffler [1]. Although this spectrum was not used in any way in our experiment or in its analysis, we showed a comparison of this spectrum (referred to below for brevity as the Mainz spectrum) with our ^{12}C-α-coincidence α spectrum in Fig. 15 of our paper. We present here a clarification of the calibration procedure.

The Mainz spectrum consists of a quarter of the data on the basis of which the Mainz group first reported [2] the detection of the parity-violating group of α particles from the 2^- excited state of ^{16}O, now known to be at $E_x = 8.8719 \pm 0.0005$ MeV [3]. The apparatus for this experiment was described in a paper published a year earlier, which also reported the observation of a narrow α group resulting from the first-forbidden ^{16}N β decay to the 2^+ ^{16}O state [4], now known to be at $E_x = 9.8445 \pm 0.0005$ MeV [3]. A third paper describes further work by the Mainz group, with improved apparatus, and $\sim$4 times the number of α particles detected for the 1970 letter, establishing the parity-violating α width of the 2^- state more precisely [5].

The location of the α groups from the 2^- and 2^+ ^{16}O states, with energies of 1282.3 ± 0.5 and 2011.5 ± 0.6 keV, respectively, and the identification by Dr. Wäffler of the position in the spectrum corresponding to the α group from the 2^- ^{16}O state, made it possible for us to calibrate the true E_α energy scale for the Mainz spectrum. As noted in our paper, our coincidence α spectrum was calibrated independently by the β-delayed α particles from ^{18}N and ^{20}Na, in exactly the same experimental geometry as our measurement of the ^{16}N α spectrum employed. It is clear from Fig. 15 of our paper that the two spectra agree on the high-energy side of the main peak well within the stated accuracy of either calibration, but the Mainz spectrum shows evidence of an enhancement on the low-energy side of the peak that is likely to be the result of the low-energy tail of the system response function. In the case of our experiment, it was possible to remove this tail of degraded pulses because of the two-dimensional, coincidence data acquisition and the good energy resolution of the experiment.

We note that a similar calibration of the Mainz spectrum by the 2^- and 2^+ ^{16}O states was made by F. C. Barker more than 25 years ago [6], and this calibrated spectrum has been employed in several subsequent publications [7–10].

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