Erratum: Heavy Cluster Knockout Reaction $^{16}O(^{12}C, 2^{12}C)^4He$ and the Nature of the ^{12}C-^{12}C Interaction Potential [Phys. Rev. Lett. 106, 022501 (2011)]

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The present Erratum is to notify that, in our work on the 118.8 MeV $^{16}O(^{12}C, 2^{12}C)^4He$ reaction, besides the direct knockout contribution, there arise contributions from some predominantly α decaying ^{16}O resonances which we overlooked. The α decay of these ^{16}O excited states (between 11.5 and 21 MeV of excitation) have same kinematics as the direct knockout of ^{12}C from ^{16}O. Contributions from these resonances can also account for some enhancement in the cross section values in our E_1 spectrum (Fig. 4 of [1]) besides that arising from the 3.65 fm repulsive core in the ^{12}C-^{12}C interaction of our direct knockout interpretation. The contributions from theses resonances are therefore estimated from the direct inelastic scattering formalism of Bessel, Satchler, and Drisko [2]. Corresponding to our experimental geometry, the $\theta_{\text{c.m.}}(^{16}O^*)$ comes to be between 95° and 105° and the differential cross section values are found to be between $\sim$1–2 μb/sr in the center-of-mass (c.m.) frame of reference.

A check on these estimates is obtained by extrapolating the $E_{^{16}O} = 80$ to 124 MeV $^{12}C(^{16}O, ^{16}O^*)^{12}C$ inelastic angular distribution data of Szilner *et al.* [3]. For $\theta_{\text{c.m.}}(^{16}O) \sim 95°$ or 105°, the $d\sigma/d\Omega$ value comes to $\sim$1.85 μb/sr, close to our estimated value from theory, $\sim$1–2 μb/sr. The Jacobian for $d\Omega_1 d\Omega_2$ from the c.m. frame to the laboratory frame ($\sim$ 10) leads to a resonance contribution to our 118.8 MeV $^{16}O(C, 2C)^4He$ reaction to $\leq$ 18.5 μb/sr^2 MeV, about 15% of the peak value observed in our experiment. This much reduction in the peak value of the direct knockout cross section in the spectrum is expected to reduce the repulsive core radius from 3.65 fm to $\sim$3.2 fm. In future searches, however, for heavy cluster knockout reactions, in the energy domain of 5–15 MeV/A, several systematic measurements with good energy resolution, higher statistics, and proper choice of angular correlations are desirable so as to avoid the resonance contributions.

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[1] B. N. Joshi *et al.*, Phys. Rev. Lett. **106**, 022501 (2011).
[2] R. H. Bassel *et al.*, Nucl. Phys. **89**, 419 (1966).
[3] S. Szilner *et al.*, Nucl. Phys. **A779**, 21 (2006).

