Erratum: Persistence of the $Z = 28$ Shell Gap Around ^{78}Ni: First Spectroscopy of ^{79}Cu [Phys. Rev. Lett. 119, 192501 (2017)]

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In this Letter, we presented experimental inclusive and exclusive cross sections for the $^{80}\mathrm{Zn}(p,2p)^{79}\mathrm{Cu}$ reaction and compared them to theoretical single-particle cross sections that were calculated within the distorted-wave impulse approximation (DWIA) [1]. For the ground state, the low-lying $\pi p_{3/2}$ state and the knockout of a $f_{7/2}$ proton, these numbers were to be multiplied by the corresponding spectroscopic factors from the Monte Carlo shell model [2] to yield the total theoretical cross section.

By considering the treatment of two identical protons, the total (p, p) cross section σ_{pp} is defined by a differential cross section $d\sigma_{pp}/d\Omega$ integrated over the solid angle Ω and divided by two. The triple differential cross section (TDX) $d^3\sigma_{p2p}/dE_1 d\Omega_1 d\Omega_2$, where E_1 (Ω_1) is the energy (solid angle) of one outgoing proton and Ω_2 is the solid angle of the other proton, corresponds to $d\sigma_{pp}/d\Omega$ specified by the kinematics of the incoming proton and the outgoing protons, taking into account distortion effects, momentum distribution of the nucleon inside a target, and a phase space factor. The $(p, 2p)$ cross section σ_{p2p} is then defined by the TDX integrated over E_1, Ω_1, and Ω_2, divided by two. Since we counted the number of events in which two protons are detected to evaluate σ_{p2p}, the theoretical values that we reported in this Letter should accordingly be divided by two for all single-particle configurations.

The DWIA transition matrix was furthermore evaluated with a better numerical accuracy. For the ground state, the low-lying $\pi p_{3/2}$ state, and the knockout of a $f_{7/2}$ proton, the single-particle cross sections become 1.0, 1.3, and 1.1 mb, respectively. They depend only weakly on the excitation energy. Multiplied by the theoretical spectroscopic factors, a total cross section of 9.3 mb can be obtained compared to the measurement of 7.9(4) mb. The result does not affect the conclusions of this Letter, but it shows that there is good agreement between experiment and theory since the amount of correlations that are incorporated in the shell-model calculation and that reduce the theoretical cross section are better taken care of than we found initially.

[1] T. Wakasa, K. Ogata, and T. Noro, Prog. Part. Nucl. Phys. **96**, 32 (2017).
[2] Y. Tsunoda, T. Otsuka, N. Shimizu, M. Honma, and Y. Utsuno, Phys. Rev. C **89**, 031301(R) (2014).

