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Theory for knockout reactions

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Theory for knockout reactions

Knockout reactions with protons or light nuclei at intermediate energies have been used for many years as a tool to extract information of stable and exotic nuclei, e.g., single-particle structure, short-range correlations or cluster formation. They are often described theoretically in an eikonal approach that was applied rather successfully in the analysis. However, secondary processes might affect the cross sections, e.g., a knocked-out nucleon can destroy the core or target. There are different, but conflicting suggestions to include such effects, see, e.g., [1,2], and also the importance of the separation-energy is discussed [3]. In this contribution, the basic features of an alternative approach are presented that will be realized in a new reaction code. It relies on a statistical simulation of the reaction process that uses a modified eikonal approach in combination with single-particle wave functions from a mean-field model of the participating nuclei.

[1] C.A. Bertulani, Phys. Lett. B 846 (2023) 138250
[2] M. Gomez-Ramos, J. Gomez-Camacho, and A.M. Moro, Phys. Lett. B 847 (2023) 138284
[3] C. Hebborn and P. Capel, Phys. Lett. B 848 (2024) 138413

Collaboration

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