Coulomb dissociation of one- and two-neutron halos in halo EFT

BIJAYA ACHARYA, DANIEL PHILLIPS, Ohio University — In neutron halo nuclei the neutron distribution extends significantly beyond the region occupied by the nuclear “core.” Halo effective field theory (Halo-EFT) exploits the consequent separation of scales in order to predict relationships between low-energy observables in these systems as a systematic expansion in $R_{\text{core}}/R_{\text{halo}}$. This talk will discuss results for the Coulomb dissociation of neutron halo nuclei in this framework. In particular, we consider the Coulomb dissociation of $^{19}$C [1]. We compute the reduced transition probability ($d\mathcal{B}(E1)/dE$) for excitation of the bound-state neutrons to the continuum up to N$^2$LO in the Halo-EFT expansion. By comparing the prediction with data from RIKEN [2] we are able to extract accurate results for $^{19}$C’s one-neutron separation energy and asymptotic normalization coefficient. Good agreement between data and Halo-EFT is also found for the longitudinal momentum distribution of $^{19}$C. Results from ongoing work to extend this calculation to two-neutron halos will also be presented [3].


Supported by the US Department of Energy under grant DE-FG02-93ER40756.