DREB2014 - Direct Reactions with Exotic Beams



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Extracting electric dipole breakup cross section of one-neutron halo nuclei from inclusive breakup observables

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How to extract an electric dipole (E1) breakup cross section \sigma (E1) from one-neutron removal cross sections measured at 250MeV/nucleon

by using 12C and 208Pb targets, \sigma_{-1n}^{C} and

It is shown that within about 5% error, \sigma (E1) can be obtained by subtracting \Gamma \sigma_{-1n}^{C} from \sigma_{-1n}^{Pb}, as assumed in preceding studies. However, for the reaction of weakly-bound projectiles, the scaling factor \Gamma is found to be about two times as large as that usually adopted. As a result, we obtain 13–20% smaller \sigma (E1) of ^{31}Ne at 250MeV/nucleon than extracted in a previous analysis of experimental data. By compiling the values of \Gamma obtained for several projectiles, \Gamma=(2.30+/-0.41)\exp(-S_n)+(2.43+/-0.21) is obtained, where S_n is the neutron separation energy.

The target mass number dependence of the nuclear parts of the one-neutron removal cross section and the elastic breakup cross section is also investigated.

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