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Breakup dynamics of a neutron-halo projectile on heavy target at deep sub-barrier energies

By studying the total fusion and breakup cross-sections in the interaction of the neutron-halo 11Be projectile on the lead target 208Pb, it is shown that, even for the neutron-halo projectile, the breakup channel remains the most dominant reaction channel at sub-barrier energies, following a characteristic behavior that was also previously verified for the case of the proton-halo projectile 8B. This feature is found to emanate from the enhancement of the breakup cross-section, due to the continuum–continuum couplings (CCC) coming exclusively from its Coulomb component. We further speculate that the enhancement of the Coulomb breakup cross-section at sub-barrier incident energies by the CCC could be associated with the projectile breaking up on the outgoing trajectory, provided these couplings can be proven to delay the breakup process.

Notes

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