Contribution ID: **367** Type: **Oral**

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

Saturday 5 July 2025 16:50 (20 minutes)

By studying the total fusion and breakup cross-sections in the interaction of the neutron-halo ^{11}Be projectile on the lead target ^{208}Pb, it is shown that, even for the neutronhalo 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 ^{8}B. This feature is found to emanate from the enhancement of the breakup cross-section, due to the continuum-continuum couplings 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 continuum-continuum couplings could be associated with the projectile breaking up on the outgoing trajectory, provided these couplings can be proven to delay the breakup process.

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Session Classification: 1. Experimental and theoretical studies of nuclei

Track Classification: Section 1. Experimental and theoretical studies of nuclei.