Contribution ID: **254** Type: **Oral report**

Investigation of low-lying resonances in breakup of halo nuclei within the time-dependent approach

Friday 24 September 2021 14:15 (25 minutes)

We investigate the Coulomb breakup of ^{11}Be halo nuclei on a heavy target from intermediate (70 MeV/nucleon) to low energies (5 MeV/nucleon) within the non-perturbative time-dependent approach. The convergence of the computational scheme is demonstrated in this energy range including \textit{n}+^{10}Be low-lying resonances in different partial and spin states. We have found a considerable contribution of the $5/2^+$ resonance (E_r= 1.23 MeV) to the breakup cross section at 30 MeV/nucleon and lower, while at higher energies, the resonant states $3/2^-$ and $3/2^+$ (with E_r= 2.78 and 3.3 MeV) make most visible contributions. The obtained results are in good agreement with experimental data available at 69 and 72 MeV/nucleon. Comparison with the existing theoretical calculations of other authors for 20 and 30 MeV/nucleon is also made. The developed computational scheme opens new possibilities in the investigation of the Coulomb, as well as nuclear, breakup of other halo nuclei on heavy and light targets.

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Session Classification: Section 1. Experimental and theoretical studies of the properties of atomic nuclei

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