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Investigation of spectral structure of 11Be in breakup reactions within quantum-quasiclassical approach

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We investigate the breakup of ^{11}Be halo nuclei on a light (^{12}C) and heavy (^{208}Pb) targets from intermediate (67 MeV/nucleon) to low (5-30 MeV/nucleon) energies within non-perturbative quantum-quasiclassical approach, in which the three dimensional time-dependent Schrödinger equation for halo nucleon was integrated simultaneously with the classical Hamiltonian equations describing relative projectile-target dynamics.
The uniqueness of our calculations lies in the inclusion of low-lying resonances ($3/2^-$, $3/2^+$ and $5/2^+$) in the breakup cross section of the ^{11}Be nucleus. The obtained results describe well the existing experimental data and also are in comparative agreement with other existing calculations performed with alternative theoretical models at 67 MeV/nucleon and 20 MeV/nucleon. Summarizing, the developed computational scheme can potentially be useful for interpretation of low-energy experiments on studying breakup of halo nuclei.

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