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COULOMB NUCLEAR INTERFERENCE EFFECT IN BREAKUP REACTION OF 26P HALO NUCLEI

COULOMB NUCLEAR INTERFERENCE EFFECT IN BREAKUP REACTION OF 26P HALO NUCLEI

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In contrast to stable nuclei, halo nuclei have some unique characteristics, such as a relatively low separation energy and a large RMS radius. We must examine the breakup reaction of these unique nuclei in order to examine their structure and reaction dynamics. Breakup reactions can divided into two categories: Coulomb breakup reactions and nuclear breakup reactions. However, the interference effect between these two phenomena is crucial to understand because both occur together instead of separately.

We have investigated the Coulomb nuclear interference effects in the breakup reaction of 26P halo nuclei with three different targets (i.e., 12C, 58Ni, 208Pb) at 40-100 MeV/n beam energies. Here, we investigated two types of interference: the total Coulomb (which included both Recoil and Direct term) and Diffraction, and the other between the Recoil and Direct. Coulomb breakup calculation used the semi-classical method to all order perturbation theory, and nuclear breakup used Eikonal approximation in the Glouber model as given in ref.[1, 2, 3, 4].

We have deduced from the results that the percentage interference effect depends on the projectile's beam energy and target size. However, it is small for heavy and small-mass targets and more significant for medium-mass targets. As a result, interference effects become more predominant as we move towards medium mass targets and higher-energy reactions, which can be advantageous in understanding the structure and their significance in the future astrophysical reaction of halo nuclei.

References

[1] Jerome Margueron, Angela Bonaccorso, and David M Brink. Coulomb-nuclear coupling and interference effects in the breakup of halo nuclei. Nuclear Physics A, 703(1-2):105–129, 2002.
[2] A García-Camacho, G Blanchon, A Bonaccorso, and DM Brink. All orders proton breakup from exotic nuclei. Physical Review C, 76(1):014607, 2007.
[3] Ravinder Kumar and Angela Bonaccorso. Dynamical effects in proton breakup from exotic nuclei. Physical Review C, 84(1):014613, 2011.
[4] Surender and Ravinder Kumar. Investigation of coulomb diffraction interference in 23Al breakup reaction. Acta Physica Polonica B, 54(9), 2023.

Section

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