独立行政法人理化学研究所　仁科加速器研究センター
第173回 RIBF核物理セミナー
RIKEN Nishina Center for Accelerator Based Science
The 173rd RIBF Nuclear Physics Seminar

Spectroscopy of p-wave neutron halo nuclei via neutron removal reactions

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Recently, nuclei around the "island of inversion" that exhibit a p-wave halo component have received much attention. Since 31Ne, in the island of inversion, was found to have a significant halo component, a number of theoretical and experimental studies have been performed. To explain the existence of a halo in nuclei with N = 20 - 28, shell evolution and pf-shell mixing are necessary. From an experimental point of view, spectroscopy of the valence neutron orbitals is of critical importance to clarify the origin of this evolution.
We will present our study, which addresses the spectroscopy of neutron-rich nuclei around the island of inversion, especially for 31Ne and 37Mg. For this study, the distinct Coulomb and nuclear 1n-removal reaction probes are used at energies around 240 MeV/nucleon. The present analysis exploits the different sensitivities of these reaction mechanisms to obtain the ground state separation energy, spin parity and spectroscopic factors.

Feb. 18(Tue.), 2014　15:30～
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