HAW05-2005-000166

Abstract for an Invited Paper
for the HAW05 Meeting of
the American Physical Society

Exotic structure of unstable nuclei from the nuclear moment study[1]

YUTAKA UTSUNO, Japan Atomic Energy Research Institute

The structure of unstable nuclei is often rather different from that of stable ones, including the disappearance of the magic structure, halo structure, new types of cluster structure, *etc.* For even-even nuclei, the in-beam spectroscopy is very useful to reach such exotic structures, while the nuclear moment is one of the most powerful probes to directly investigate the ground-state structure of odd-A and odd-odd nuclei. For instance, the systematic study of the nuclear moment in Na isotopes has played a crucial role in determining where the $N = 20$ magic structure disappears. Namely, this disappearance was considered to be restricted to some of $N \geq 20$ isotopes from a naive comparison of experiment with the sd-shell calculation about the ground-state spin and the separation energy. On the other hand, it has been recently clarified that the disappearance completely occurs at $N = 19$ from comparison of the magnetic dipole and electric quadrupole moments between a recent experiment and the Monte Carlo shell model calculation. Along this line, several experimental data for other nuclei are being accumulated now. As for the moment of the excited state, it is pointed out, for instance, that the g factor and the quadrupole moment of the 2_1^+ state carry much information on the collectivity: the former tells us the proton- and neutron-contribution to the rotation, and the latter is related to the intrinsic shape. Around ^{132}Sn, a recent shell-model calculation has succeeded in reproducing both the $E2$ transitions and the g factors in this region, showing a certain deviation from simple collective models. In this talk, I would like to give an overview about how the nuclear moment clarifies exotic structure of unstable nuclei as exemplified above.

[1]Supported in part by Grants-in-Aid (13002001), (14740176) and (17740165) from the MEXT of Japan.