High Spin Physics 2001, Warsaw, February 6-10, 2001

Abstract No: 035
Submitted on: 8 Jan 2001, 18:48 GMT

Title: **Rotational Properties of Neutron Drip-Line Nuclei**

Author(s): Witold Nazarewicz[1-3]
Affiliation(s): [1]*Department of Physics, University of Tennessee, Knoxville, Tennessee 37996,* [2]*Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831,* [3]*Institute of Theoretical Physics, Warsaw University, ul. Hoża 69, PL-00681, Warsaw, Poland*

Moving away from stable nuclei by adding either protons or neutrons, one finally reaches the particle drip lines. The neutron-rich, weakly-bound nuclei close to the neutron drip line have very unusual properties: they are large, diffused, and superfluid [1]. The main objective of this talk is to discuss some of the theoretical challenges and opportunities for high-spin studies of neutron-rich nuclei provided by radioactive nuclear beams.

The systematic behavior of rotational bands in deformed neutron-rich nuclei is investigated with the cranked Skyrme-Hartree-Fock approach and the deformed shell model. In particular, rotational properties and isovector deformations of heavy Ne and Mg isotopes are studied together with quasi-particle spectra of heavy Er isotopes. The effect of the increased surface diffuseness gives rise to the change in the position of the high-j intruder shell, and this has a significant effect on nuclear rotation.

This work has been carried out in collaboration with Jacek Dobaczewski, Mladen Matev, Shoujirou Mizutori, Rafał Nowakowski, and Wojtek Satuła. It was supported by the U.S. Department of Energy under Contract Nos. DE-FG02-96ER40963 (University of Tennessee), DE-AC05-00OR22725 with UT-Battelle, LLC (Oak Ridge National Laboratory), and by the Polish Committee for Scientific Research (KBN) under contract No. 2 P03B 040 14

References

[1] J. Dobaczewski and W. Nazarewicz, Phil. Trans. R. Soc. Lond. A **356**, 2007 (1998).

Invited talk.