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

Abstract No: 016
Submitted on: 28 Dec 2000, 10:37 GMT

Title: **Spectroscopy of Superdeformed Pb Isotopes***

Author(s): H. Hübel
Affiliation(s): Institut für Strahlen- und Kernphysik, Universität Bonn, Nussallee 14-16, D-53115 Bonn, Germany

In our recent work we have concentrated on an investigation of superdeformed (SD) Pb isotopes in an attempt to make configuration assignments to the observed bands. Comparison to theoretical calculations shows how well the mean-field approach can reproduce energy levels at extreme deformation. It is also of great interest that theory predicts octupole vibrations in the A = 190 region which may be responsible for the lowest excited states in the even-even isotopes.

Information that can lead to configuration assignments has to come from the following observables: The spin-fitting method can help to make spin assignments. The relative intensities of the bands indicate the ordering in excitation energy. If M1 transitions between signature-partner bands are observed, g factors can be derived and compared to theoretical values for various configurations. The dynamical moments of inertia contain information about alignment effects and possible blocking of intruder orbitals. The quadrupole moments depend also on the intruder configurations. Furthermore, quasiparticle routhians and their signature splittings can be compared to calculations. Finally, in cases where enhanced E1 transitions between bands exist, the excited bands may be built on octupole vibrations.

We have investigated an odd-A nucleus, ^{193}Pb, and an even-even nucleus, ^{196}Pb, using the Gammasphere and Euroball spectrometer arrays, respectively [1, 2]. High-spin states in ^{193}Pb have been populated in the ^{168}Er(^{30}Si,5n) reaction at the 88-Inch Cyclotron, Berkeley. In addition to the previously known six SD bands three new bands have been found [1]. From the properties of the bands, quasiparticle configuration assignments are made and compared to cranked shell model calculations. More than half of the predicted routhians near the Fermi surface have now been identified experimentally. SD bands in ^{196}Pb have been populated in the ^{170}Er(^{30}Si,4n) reaction at the Vivitron, Strasbourg. In this nucleus, where four bands are known [3], the E1 multipolarity of a group of transitions around 945 keV connecting an excited to the yrast SD band has been determined from a linear polarisation measurement using the Clover Ge detectors of the Euroball spectrometer. These transitions, which compete with the highly collective in-band E2 transitions, are strongly enhanced (B(E1) $\simeq 10^{-4}$ Wu). This supports calculations [4] which predict low-lying octupole vibrations in the A = 190 region.

*Supported by BMBF, Germany, under contract no. 06 BN 907 and by the European Community - Access to Research Infrastructure.

References

[1] D. Rossbach et al., Nucl. Phys. **A 660**, 393 (1999)

[2] D. Rossbach et al., to be publ.

[3] S. Bouneau et al., Z. Phys. **A 358**, 179 (1997)

[4] T. Nakatsukasa et al., Phys. Rev. **C 53**, 2213 (1996)

Preferred presentation of the contribution: in the oral session.