Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Rotation around the longest principle axis in ^{142}Gd I. RAGNARSSON, B.G. CARLSSON, Math. Phys., Lund Univ., Box 118, 221 00, Lund, Sweden, E.O LIEDER, R.M. LIEDER, IKP, 52425 Julich, Germany; iThemba Labs, South Africa, A.A. PASTERNAK, A.F. Ioffe Phys. Techn. Inst., 198904 St. Petersburg, Russia — It is difficult to verify triaxial shape in nuclei and no case has been clearly established where a triaxial nucleus rotates around the longer axis ($\gamma < -60°$). In view of this fact, the yrast band of ^{142}Gd (Z=64, N=78), which has been observed to I=34, displays some interesting features. The general properties of the band show that it is built with no particles excited across the N=82 gap, but with four protons excited across the Z=64 gap, i.e. it has a $\pi(\mathrm{h}_{11/2})^4\nu(\mathrm{h}_{11/2})^{-2}$ high-j configuration. This configuration leads to triaxial shape with well-developed potential energy minima calculated for rotation around all three principal axes but with rotation around the intermediate axis energetically favoured at $I \approx 20$. However, a change of rotation axis takes place, because it is only for rotation around the longer axis that it is possible to build $I > 30$ states. This conclusion is based on general rules how high-j particles and holes align their spin vectors, and is supported by our recent lifetime measurements indicating a small collectivity at high spins. Another interesting feature is that the yrast states around I=40 are predicted to be dominated by favoured terminations at prolate shape. Cranking calculations and particle-rotor calculations will be presented to support our general conclusions.

Ingemar Ragnarsson
Div. of Mathematical Physics, LTH, Lund Univ.
P.O. Box 118, S-221 00, Lund, Sweden

Date submitted: 15 Jan 2007 Electronic form version 1.4