Blocking Effect and Moments of Inertia of K=1/2 Rotational Band in ^{171}Yb

YU Shao-Ying,[1,2,3] LIU Yan-Xin,[1,2] LIU Shu-Xin,[4] and HE Xiao-Tao[3]

[1] College of Science, Huzhou University, Huzhou 313000, China
[2] College of Physics and Electromechanics, Inner Mongolia University for Nationalities, Tongliao 028043, China
[3] Institute of Theoretical Physics, the Chinese Academy of Sciences, Beijing 100080, China
[4] Department of Physics, Peking University, Beijing 100871, China
(Received: 2003-10-9; Revised: 2004-2-5)

Abstract: The K=1/2 rotational band in ^{171}Yb is investigated using the particle number conserving (PNC) method for treating the cranked shell model with monopole and quadrupole pairing interactions. The experimental moments of inertia of ^{171}Yb [521]1/2 (signature $\alpha = \pm 1/2$) are reproduced well by the PNC calculation, in which no free parameter is involved. The difference in the contribution to the moment of inertia between protons and neutrons is mainly due to the blocking effect of neutron normal orbitals. The ω variation of the occupation probability of each cranked orbital and the contribution to the moment of inertia from each major shell and from each cranked orbital are investigated.

[Full text: PDF]

Close