study on rotational bonds for some nuclei 155

kasem abd el malek godo

The broken polynomial expression can be used for prediction of energy levels of the ground-state band and super-band above Icro„. The results obtained are in good agreements with the experimental data for the six nuclei subject of this thesis.Using another method of prediction (VMI-model) we obtain generally good fitting to the rotational energy levels (g.b. and s.b.) for the nuclei have been investigated. The parameters of each model are given through the text.The super band crosses the ground state band around spin 14+ for 176Pt and 184Pt, while the super band crosses the ground state band around spin 16+ for 178Pt and 182Pt; the super band crosses the ground state band around spin 18+ for 180Pt and 12+ for 186N.This crossing may cause the backbending. The backbending phenomenon is currently interpreted as the band crossing of the ground state rotational band and the spin aligned particle super band. Especially i,, neutrons are considered to be responsible for the backbending in these2nuclei due to the large Coriolis force.the alignment value is 3.1h at ho), = 0.33Mev for 176 Pt, in 178 Pt nucleus, the ground state band exhibits a crossing around hoic = 0.33Mev with a gain in an alignment of —4.3h, we observe a rather sharp backbending around a rotational frequency of hoi 0.32Mev in the ground state band with aligned gain 5.3h for 180Pt, the alignment value is 4.2h at rink = 0.32Mev for 182 Pt, the alignment value is 9.6h at hoic = 0.31Mev for 184 Pt, in the yrast of 186Pt only one crossing at hco-0.24Mev is seen, the alignment gain of Ai-4.4h.- 52 -CONCLUSIONTo investigate the nature of the observed bands and their crossings, we plot the quasiparticle routhian (e’) as function of rotational frequency. The relative quantities, e’, and i, tell us which energy and angular momentum the nucleus carries in addition to the collective part of these quantities. The plots of the quasiparticle energies e’ in the rotating frame of reference (routhians) versus hco, show deviations from straight lines already at the lowest observed ha). This indicates considerable softness of these nuclei. It may be interpreted in terms of shape changes and / or internal structure (quasiparticle configuration) changes of the ground-state rotational band.