phenomenological description of the yrast bands in 160,162,164,166 yb nuclei band crossings and moment of inertia

karema alsayed abdel maged

The bE’havior of the yrast bands in the rotating 70-proton even-8ven Yb isotopes up -to high ang4lar momentum werestudied thr01}gh spectroscopy of the discrete y rays.Two methods of calculations have been used to fit thepreviously presented data onparticle bands in 160Yb, 162Yb,rotationally aligned qua~i-164 Yb and 166 Yb. Backbend1. ngsof moment of inertia of the Yrast states can be reproducedreasonably well.The energy levels and the effective moment of inertiafor both g.s. and s-bands are calculated and compared withthe experimental data.First and second moments of inertia were derivedthrough the alignment calculations. The interaction strengthcalculations are presented. Possible evidences for theclassification of the interaction between the intersectingbands (g.s. and s.b.) are discussed.This thesis is concerned with studying of nuclearstructure of the yrast bands in 160 ’ 1 62 ’ 164 ’ 166Yb nuclei.This has been carried out by studying the discrete linetransitions in aligned bands of the four nuclei, even Ybisotopes 160-166Yb. Recent studies of the discrete deexcitationgamma rays from heavy ion fusion reactions have revealedmany interesting phenomena such as backbending and nucl~arshape changes.The thesis consists of three chapters :Chapter I : is the general introduction to nuclear modelsand survey of the previous works.Chapter II : Consists of , the methods of calculations forthe prediction of the energy levels, thecranked shell model and the interactionstrength.Chapter III : Consists of the results and discussions forthe four Yb nuclei.