

SUMMARY

The behavior of the yrast bands in the rotating 70-proton even-even Yb isotopes up to high angular momentum were studied through spectroscopy of the discrete γ -rays.

Two methods of calculations have been used to fit the previously presented data on rotationally aligned quasi-particle bands in ^{160}Yb , ^{162}Yb , ^{164}Yb and ^{166}Yb . Backbendings of moment of inertia of the Yrast states can be reproduced reasonably well.

The energy levels and the effective moment of inertia for both g.s. and s-bands are calculated and compared with the experimental data.

First and second moments of inertia were derived through the alignment calculations. The interaction strength calculations are presented. Possible evidences for the classification of the interaction between the intersecting bands (g.s. and s.b.) are discussed.

This thesis is concerned with studying of nuclear structure of the yrast bands in $^{160,162,164,166}\text{Yb}$ nuclei. This has been carried out by studying the discrete line transitions in aligned bands of the four nuclei, even Yb isotopes $^{160-166}\text{Yb}$. Recent studies of the discrete deexcitation gamma rays from heavy ion fusion reactions have revealed many interesting phenomena such as backbending and nuclear shape changes.

The thesis consists of three chapters :

Chapter I : is the general introduction to nuclear models and survey of the previous works.

Chapter II : Consists of , the methods of calculations for the prediction of the energy levels, the cranked shell model and the interaction strength.

Chapter III : Consists of the results and discussions for the four Yb nuclei.