Description of Superdeformed Bands in A ~ 190 Mass Region in Framework of Suggested Three Parameters Nuclear Collective Model

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Transition energies in eighteen superdeformed notational bands (SDRB's) for nuclei in A ~ 190 mass region are calculated and examined by using a noval collective model depends on three parameters only. The bandhead spin of each band is predicted by parameterization Harris expansion of dynamical moment of inertia and rotational frequencies. The model parameters are adjusted by best χ fitting procedure in order to minimize the relative root mean square deviations between experimental transition energies and the calculated ones. An excellent agreement between them is found which good supports to our suggested model. By using the calculated E_2 transition γ - energies for each band the rotational frequencies $\hbar\omega$, the Kinematic $J^{(1)}$ and dynamic $J^{(2)}$ moments of inertia are obtained. The variation $J^{(1)}$ and $J^{(2)}$ with increasing $\hbar\omega$ are investigated. We extended our proposed model by adding to the excitation energy a linear spin dependent behavior to investigate the staggering in transition energies. To exhibit more clearly the $\Delta I=2$ staggering effect in transition energies of SDRB's in ^{194}Hg and ^{194}Tl a staggering index $\Delta^{(4)}E_\gamma(I)$ is proposed which represent the finite difference approximation to the fourth order derivative of the transition energies at a given spin. A significant Zigzag has been observed. In our selected SDRB's there are six signature partner pairs of ^{194}Hg, ^{193,195,197}Pb which exhibit $\Delta I=1$ staggering, it is examined through a staggering index Y(I) which interlinking transition energy between the signature partner pair and the transition energies within each band. The bandhead moments of inertia of those signature partner pairs have been found to be identical and clear large amplitude staggering have been observed. The transition energies of the yrast SD band ^{192}Hg(SD1) is found to be identical to the yrast SD band ^{194}Pb(SD1) and to the excited SD3 band of ^{194}Hg(SD3) within the frequency range $\hbar\omega$~0.2-0.4 MeV, which implies that their dynamical moments of inertia $J^{(2)}$ are almost identical.