Deformation of the saddle point in heavy ion induced fusion-fission reactions

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There has been a long standing discrepancy [1] between the deduced effective moment of inertia ($\Im_{eff}$) from α induced fission reactions and the values predicted by the rotating liquid drop model(RLDM) [2]. The rotating finite range model (RFRM) [3] has removed the above discrepancy partially. Though the agreement between the RFRM predictions and the experiment results (see Fig. 1) is good for high ($\frac{Z^2}{A}$), for low ($\frac{Z^2}{A}$) the deduced $\Im_{eff}$ values are more close to RLDM predictions. There is no experimental data for intermediate values of ($\frac{Z^2}{A}$). Further, these models are not well tested in heavy-ion induced fusion-fission reactions involving large angular momentum values.

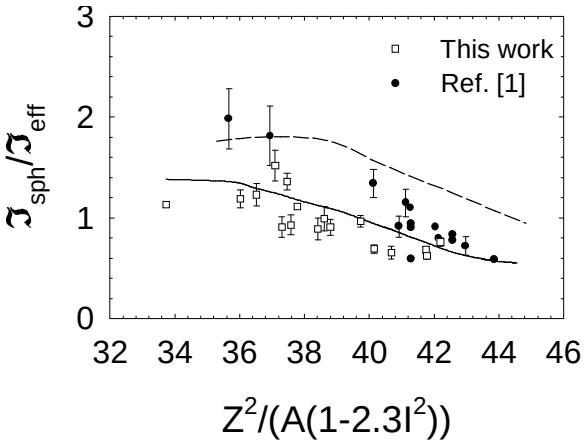

Figure 1: Comparison of the ratio of the moment of inertia of a sphere to effective moment of inertia at the saddle-point. The dashed and the continuous lines are the RLDM and the RFRM predictions respectively.

In the present work, we have systematically determined the $\Im_{eff}$ values from detailed statistical model analysis of heavy-ion induced fission fragment angular distributions. It is observed (Fig.1) that the deduced values of $\Im_{eff}$ are consistent with the RFRM predictions over the entire range of ($\frac{Z^2}{A}$).

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