COMPOUND AND ROTATIONAL DAMPING IN WARM NUCLEI

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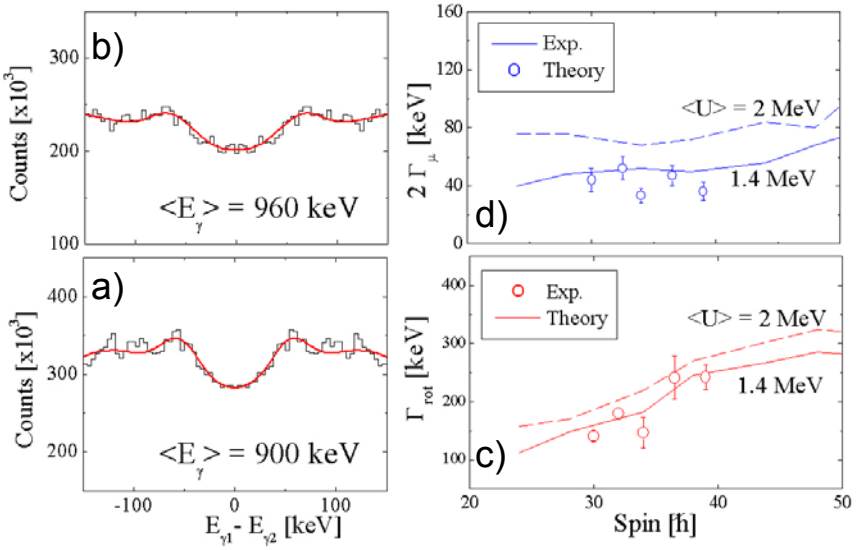
The γ-decay in the quasi-continuum is used to study the interplay between rotational motion and compound nucleus formation in deformed nuclei. A new analysis technique is presented which allows for the first time to directly measure the rotational and compound damping width Γ_{rot} and Γ_{μ} from an interpolation of the ridge-valley structure observed in γ–γ coincidence spectra [1]. The method is first tested on simulated spectra and then applied to high-statistics EUROBALL data on ^{163}Er, as shown in panel a) and b). Experimental values of ≈ 150 and 20 keV are obtained for Γ_{rot} and Γ_{μ}, respectively, in the spin region I ≈30-40 $\hbar$ (panel c) and d)), in good agreement with microscopic cranked shell model calculations for this specific nucleus [2]. A dependence of rotational damping on the K-quantum number of the nuclear states is also observed, both in experiment and theory, resulting in ≈ 30% reduction of Γ_{rot} for high-K states. This points to a delayed onset of rotational damping in high-K configurations.



[1] M. Matsuo *et al., AIP . Conf. Proc. 656 (2003) 32-39.*

[2] M. Matsuo *et al.,* in print in *Nucl. Phys. A.*