

Correlations between fragment angular momentum and excitation energy

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We present recent experimental results that indicate the existence of significant correlations between the fragments' angular momenta and excitation energies. Both the experiment we present are based on the Chi-Nu array at the Los Alamos Neutron Science Center but are independent observations of the spin-energy correlations in fission. We find evidence of event-by-event neutron-gamma multiplicity, energy, and angular correlations in $^{252}\text{Cf(sf)}$. We have also determined an increase in quadrupole gamma rays along rotational bands with increasing incident neutron energy in $^{239}\text{Pu(n,f)}$. We briefly described the experimental methods used to determine these correlations and how the data were compared to model calculations. These experimental results indicate an increase in the average angular momentum with fragment intrinsic excitation energies.

Auteurs principaux: GHIA, Nathan (University of Michigan); MARIN, Stefano (University of Michigan)

Orateurs: GHIA, Nathan (University of Michigan); MARIN, Stefano (University of Michigan)

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