

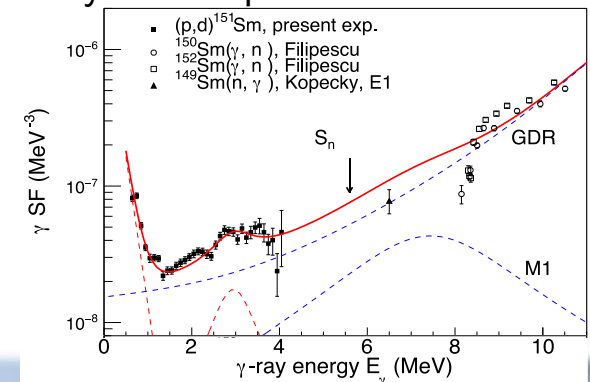
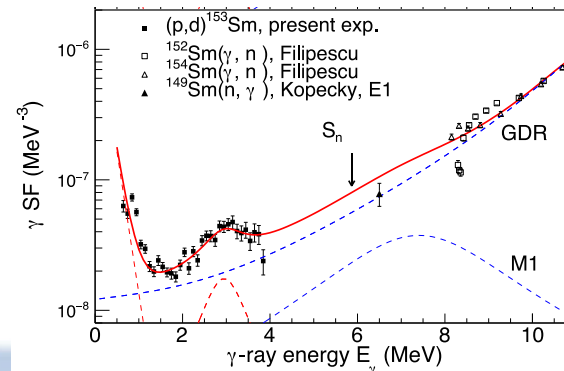
γ SF and LD of rare earth elements



Level density (LD) and gamma-strength function (γ SF) two key components of Hauser-Feshbach model calculations utilized for predicting reaction cross sections. However, a wide variety of LD and γ SF available results in a wide range of predicted cross section, thus experimental verification of LD and γ SF is required.

In this work, both LD and γ SF were extracted for $^{151,153}\text{Sm}$ isotopes. While the LD follows the constant-temperature model, the γ SF presented a surprising behavior for low energy γ -rays. An enhancement (*upbend*) in γ SF for g -rays below about 2MeV was observed for the first time in such a heavy and deformed system.

This result indicates that the upbend in the γ SF might be a feature more common among the nuclei than anticipated. This has a huge impact not only on our understanding of the nucleus and its structure, but also on the stellar nucleosynthesis predictions. Such upbend in the γ SF has a direct impact on the Hauser-Feshbach calculations of the stellar reaction rates and as such can significantly influence the predictions of network calculations that model stellar nucleosynthesis processes.



A. Simon et al., Phys. Rev. C **93**, 034303 (2016)

