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Can we use isomeric ratios to study impact of level densities?

Monday 24 March 2025 16:15 (45 minutes)

The Uppsala group has been measuring isomeric yields ratios (IYR) from fission for several years now. This work is done in collaboration with the IGISOL group of the University of Jyväskylä. The IYR are obtained using mass measurement techniques (Penning traps and multi-reflection time-of-flight), i.e., the results are not dependent on current information on, e.g., nuclear level schemes. However, the population of isomeric states with different spins is dependent on the angular momentum of the fission fragment and the de-excitation path. Therefore IYR can be used to study the question of angular momenta in fission and also the impact on level density models in de-excitation calculations (see e.g. [1-3]).

In this talk I will present the experimental work that has been done so far as well as our future plans for measuring IYR at IGISOL and other facilities. I will also present a global study that compared experimental isomeric ratios from other nuclear reactions (extracted from the EXFOR database) with predictions from model calculations using TALYS [4].

[1] V. Rakopoulos et al., Phys. Rev. C 98, 024612 (2018).
[2] A. Al-Adili et al., Eur. Phys. J. A 55, 1 (2019).
[3] Z. Gao et al., Phys. Rev. C 109, 064626 (2024).
[4] S. Cannarozzo et al., Eur. Phys. J. A 59, 295 (2023).

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