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The scissors resonance in 151Sm

As the shape of the nucleus changes, statistical properties such as the nuclear level density (NLD) and γ-strength function (γSF) are expected to be affected. In particular, the evolution of the resonance modes such as the scissors resonance (SR) depends on the deformation of the isotopes. The SR resonance in the isotopic chain of samarium is being studied by comparing the scissors resonance strength of the ^{151}Sm isotope with that of neighboring samarium isotopes.
The experiment was performed at the Oslo Cyclotron laboratory where a ^{152}Sm self-supporting target was bombarded with a 13.5 MeV deuteron beam. The knock out reaction ^{152}Sm(d,tγ)^{151}Sm populated the nucleus of interest. An array of Sodium Iodine (NaI)Tl detectors, called CACTUS, detected γ-rays and the silicon particle telescope array, called SiRi, was used to detect charged particles in coincidence. The NLDs and γSFs are being extracted below the neutron separation energy, Sn, using the Oslo Method [1].
These results will be used investigate the SR in the ^{151}Sm and the extracted SR will be compared to those of previously measured (p,dγ)^{147,149,151,153}Sm [2]and (d,pγ)^{153,155}Sm [3] isotopes. This will provide a near complete picture of the evolution of the SR in the samarium isotopic chain. I will present preliminary results of this investigation into the SR resonance in ^{151}Sm.

[1]A. Schiller et. al., Nucl. Instrum. Methods Phys. Res. A 447, 498 (2000)
[2] A. Simon and F. Naqvi, Phys. Rev. C 101, 014619 (2020)
[3]K.L. Malatji et. al., Phys. Rev C 103, 014309 (2021)

Apply to be considered for a student ; award (Yes / No)?

YES

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