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Strength of the scissors resonance in 151Sm

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The number of stable isotopes of samarium (Sm), makes this isotopic chain interesting to study at stable ion beam facilities. The scissors resonance (SR) of 151Sm was studied with the aim of understanding the evolution of the SR along the Sm isotopic chain. Change in deformation of a nucleus as it transitions from prolate through spherical to oblate, leads to changes in statistical properties particularly the nuclear level density (NLD) and γ-strength function (γSF). The evolution of resonances observed in the γSF, such as the SR which is sensitive to changes in deformation across the isotopic chain, was studied in this work. The experiment was performed at the Oslo Cyclotron laboratory where a 152Sm self-supporting target was bombarded with a 13.5 MeV deuteron beam. The reaction 152Sm (d,tγ)151Sm populated the nucleus of interest. An array of NaI(Tl) detectors, CACTUS [1], detected γ-rays and the silicon particle telescope array, SiRi [2], was used to detect charged particles in coincidence. The NLD and γSF were extracted from the particle-γ coincidences below the neutron separation energy, Sn, using the Oslo Method [3].
These results are used to place the SR in 151Sm and its magnetic dipole strength B(M1) value into the context of previously measured samarium isotopes[4, 5, 6]. I will present the results for 151Sm, which depicts a near complete picture of the evolution of the strength of the SR [B(M1)] for the stable Sm isotopic chain.

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