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The scissors resonance in ^{151}Sm

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 $^{152}\text{Sm}(d,t\gamma)^{151}\text{Sm}$ 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 γSF s are being extracted below the neutron separation energy, S_n , using the Oslo Method [1].

These results will be used to investigate the SR in the ^{151}Sm and the extracted SR will be compared to those of previously measured $(p,d\gamma)^{147,149,151,153}\text{Sm}$ [2] and $(d,p\gamma)^{153,155}\text{Sm}$ [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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Primary authors: MAGAGULA, SEBENZILE PRETTY ENGELINAH (iThemba Labs and University of the Witwatersrand); WIEDEKING, Mathis (Department of Subatomic Physics, iThemba LABS, P.O. Box 722, Somerset West 7129, South Africa. AND School of Physics, University of the Witwatersrand, Johannesburg 2050, South Africa); MALATJI, K. L (Department of Subatomic Physics, iThemba LABS, P.O. Box 722, Somerset West 7129, South Africa.); PELLEGGRI, L (Department of Subatomic Physics, iThemba LABS, P.O. Box 722, Somerset West 7129, South Africa AND School of Physics, University of the Witwatersrand, Johannesburg 2050, South Africa)

Co-authors: BECKMANN, K. S (Department of Physics, University of Oslo, N-0316 Oslo, Norway); SIEM, S (Department of Physics, University of Oslo, N-0316 Oslo, Norway); VON NEUMANN-COSEL, P. (Institut für Kernphysik, Technische Universität Darmstadt, D-64289 Darmstadt, Germany); KHESWA, B. V. (Department of Applied Physics and Engineering Mathematics, University of Johannesburg, Doornfontein 2028, South Africa AND Department of Subatomic Physics, iThemba LABS, P.O. Box 722, Somerset West 7129, South Africa); AY, K. O. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); MIDTBØ, J.E (Department of Physics, University of Oslo, N-0316 Oslo, Norway); ZEISER, F. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); HAGEN, T.W. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); INGEBERG, V. W. (Department of Physics,

University of Oslo, N-0316 Oslo, Norway); GUTTORMSEN, M. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); GÖRGEN, A. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); BELLO GARROTE, F. L. (Department of Physics, University of Oslo, N-0316 Oslo, Norway); LARSEN, A. C. (Department of Physics, University of Oslo, N-0316 Oslo, Norway)

Presenter: MAGAGULA, SEBENZILE PRETTY ENGELINAH (IThemba Labs and University of the Witwatersrand)

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