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Statistical properties of the well deformed ^{153,155}Sm nuclei and the scissors resonance

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The rare-earth isotopic chain of Samarium provides an excellent opportunity to systematically investigate the evolution of nuclear structure effects from the near-spherical ($_2$=0.00) ^{144}Sm isotope to the well-deformed system ($_2$=0.27) ^{154}Sm. As the nuclear shape changes, statistical properties such as the nuclear level density (NLD) and γ-strength function (γSF) are expected to be affected. In particular resonance modes, such as the Pygmy Dipole (PDR), Scissors Resonances (SR), and the recently discovered Low-Energy Enhancement (LEE) in the rare-earth region may reveal interesting features when their evolution is investigated across several nuclei in an isotopic chain. An experiment was performed at Oslo Cyclotron Laboratory (OCL) where the NaI(Tl) γ-ray array and silicon particle telescopes were utilized to measure particle-γ coincidence events from which the NLDs and γSFs have been extracted below the neutron threshold, Sn, using the Oslo Method (A. Schiller et al., 2000). The deuteron beam was used to populate excited states in ^{153,155}Sm through transfer reaction (d,pγ). Based on the results from these measurements, the extracted NLDs and γSFs have been used to investigate the evolution of nuclear structure effects, in particular the SR, in ^{153,155}Sm. In this talk, I will present results of statistical properties for ^{153,155}Sm and compare them to previous measurements of ^{148,149}Sm and $^{151-154}$Sm.

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