



Contribution ID: 9

Type: **not specified**

Searching for the low-energy enhancement in 91-Zr

The nuclear level density (NLD) and γ -ray strength function (SF) are quantities that give essential information about the behaviour of a nucleus at high excitation energy. NLD is denoted as the number of levels per unit of excitation energy. SF is denoted as a measure of the average reduced decay probability of a nucleus. These concepts are useful at high excitation energies where the spacing between the levels is small and gives information on degrees of freedom and underlying nuclear dynamics. The evidence of the low-energy enhancement in the SF for energies less than 4 MeV has been discovered in several nuclei. Recently, a strong enhancement of M1 transitions in 90Zr has been predicted for γ -ray energies below 2 MeV in shell model calculations. In this work we explored the existence of the low-energy enhancement in the neighbouring 91Zr isotope with the assumption that neighbouring isotopes have similar SF and hence provided first experimental NLD and SF for this nucleus. The experiment $90\text{Zr}(d,p)91\text{Zr}$ was conducted at the Oslo Cyclotron Laboratory (OCL). The SiRi (silicon telescope) array was used to detect charged ejectiles from the reaction. The CACTUS (NaI(Tl) detectors) array was utilized to detect rays that were in coincidence with charged particles. The nuclear level density and SF were extracted with the Oslo method. The existence of the LEE was observed, which agrees with the shell model calculations in 90Zr . The NLD and SF quantities were used to calculate (n, γ) cross sections with the Talys reaction codes. These were compared with experimental data from direct measurement to test the reliability of the approach used in this work.

Primary author: Mr ZIKHALI, Bonginkosi Richard (University of Zululand)

Co-author: Dr WIEDEKING, mathis (itl)

Presenter: Mr ZIKHALI, Bonginkosi Richard (University of Zululand)