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Gamma-Ray Strength Function in 74Ge from the Ratio Method

An increasing number of experiments reveal the presence of a low-energy enhancement in the gamma-ray strength function (GSF). The GSF, which is the ability of nuclei to absorb and emit γ rays, provides insight into the statistical properties of atomic nuclei. For this project the GSF was studied for 74Ge which was populated in the reaction 74Ge(p,p')74Ge at a beam energy of 18MeV. The data was collected with the STARS-LIBERACE array at Lawrence Berkeley National Laboratory. Silicon detector telescopes were used for particle identification and γ-rays in coincidence were detected with 5 Clover-type high-purity germanium detectors. Through the analysis particle-γ-γ coincidence events were constructed. These events, together with well-known energy levels, were used to identify primary γ-rays from the quasicontinuum. Primary γ-rays from a broad excitation energy region, which decay to two 0+ states, six 2+ states, two 3+ states, five 3- states, and four 4+ states, could be identified. These states and the associated primary γ-rays are used to measure the GSF for 74Ge with the Ratio Method [1], which entails taking ratios of efficiency corrected primary γ-ray intensities from the quasicontinuum. I will discuss the results from the analysis of the data from the above reaction and focus on the existence of the low-energy enhancement in 74Ge. The results are further discussed in the context of other work done in 74Ge using the (γ,γ') [2], (3He,3He') [3] and (α,α') [4] reactions.

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