



Contribution ID: 11

Type: not specified

Gamma-Ray Strength Function in ^{74}Ge 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 ^{74}Ge which was populated in the reaction $^{74}\text{Ge}(p,p')^{74}\text{Ge}$ 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 ^{74}Ge 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 ^{74}Ge . The results are further discussed in the context of other work done in ^{74}Ge using the (γ,γ') [2], $(^3\text{He},^3\text{He}')$ [3] and (α,α') [4] reactions.

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