

In-beam gamma-ray spectroscopy of ^{66}Ga : Preliminary results

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The subject of this work is the experimental study of the odd-odd nucleus ^{66}Ga produced with fusion-evaporation reaction. To describe nuclei such as ^{66}Ga , which has valence nucleons in the pf shells, the Large Scale Shell Model has been used with great success [1-6]. Odd-odd nuclei, however, are difficult to describe theoretically and their experimental study gives new information about the nuclear structure and allows testing models parameterizations. The experimental study was performed using in-beam gamma-ray spectroscopy, where two experiments have been done: the first one with the fusion-evaporation reaction $^{58}\text{Ni}(^{11}\text{B}, 2\text{pn})^{66}\text{Ga}$ at 44 MeV bombarding energy and a target of about 1,0 mg/cm² backed with 7,6 mg/cm² of Pb and the second one with the $^{51}\text{V}(^{19}\text{F}, \text{p}3\text{n})^{66}\text{Ga}$ reaction at 54 MeV bombarding energy and two thin targets of about 400 $\mu\text{g}/\text{cm}^2$. The beam was provided by the 8UD Pelletron TANDEM accelerator of the Universidade de São Paulo, Brazil. Gamma-ray and evaporated charged particle coincidences were measured with the SACI-PERERE γ -ray spectrometer [7], composed of a 4π -charged particle system consisting of 11 phoswich scintillator ΔE -E telescopes and 4 Compton-suppressed GeHP, two of them with an efficiency of 60% and the other two with an efficiency of 20%. The $^{58}\text{Ni}(^{11}\text{B}, 2\text{pn})^{66}\text{Ga}$ reaction, however, was performed using only the two 60% GeHP detectors. About 4×10^6 and 60×10^6 gamma-gamma events were collected in the $^{58}\text{Ni}(^{11}\text{B}, 2\text{pn})^{66}\text{Ga}$ and $^{51}\text{V}(^{19}\text{F}, \text{p}3\text{n})^{66}\text{Ga}$, respectively. Preliminary results have confirmed part of the known level scheme for ^{66}Ga .

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