

Measurement of gamma-ray production from neutron capture on Gadolinium for neutrino experiments

Gadolinium-157 is the nucleus, which has the largest thermal neutron capture cross-section. Gadolinium-155 also has the large cross-section. These neutron capture reactions provide the gamma-ray cascade with the total energy of about 8 MeV. This reaction is recently applied for several neutrino experiments, e.g. reactor neutrino experiments and Gd doped large water Cherenkov detector experiments, to recognize inverse-beta-decay reaction.

A good Gd(n,g) simulation model is needed to evaluate the detection efficiency of the neutron capture reaction, i.e. the efficiency of IBD detection.

This kind of study is crucial especially for water Cherenkov detectors, because of their Cherenkov threshold. In this presentation, we will report the development and study status of a Gd(n,g) calculation model and comparison with our experimental data taken at ANNRI/MLF beam line, J-PARC.

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