

## Detection of epithermal and fast neutrons with Ce doped GAGG and LYSO scintillation materials. New advantages for TOF techniques.

Recently, we demonstrated that epithermal and fast neutrons produce distinct  $\gamma$ -quanta in the energy range below 1 MeV in Gd containing media. These soft quanta can be detected in the scintillation material, containing Gd ions. One of the promising candidates for this purpose is gadolinium-gallium-aluminum garnet  $\text{Gd}_3\text{Al}_2\text{Ga}_3\text{O}_{12}$  (GAGG) doped with Ce, having high light yield and excellent energy and time resolution. In addition to Gd, another atom, namely Lu, has large neutron cross section for epithermal and fast neutrons. Hence, lutetium silicate  $\text{Lu}_2\text{SiO}_5$  (LSO-LYSO) scintillation crystal's family can be used for this purpose as well. This report presents results on the comparative study of the response of GAGG and LYSO based scintillation detectors to different neutron sources. Time resolution to detect neutrons with SiPM based detectors is evaluated. Detecting units for TOF neutron spectrometers are described.

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