Contribution ID: **33** Type: **not specified**

Investigation of internal background of 7Li and 6Li enriched CLYC scintillators

The recently developed Cs2LiYCl6:Ce (CLYC) crystals are interesting scintillation detectors not only for their energy resolution (< 5% at 662 keV) but also for their capability to identify and measure the energy of both gamma rays and fast/thermal neutrons. The thermal neutrons were detected by the 6Li(n,α)t reaction while for the fast neutrons the 35Cl(n,p)35S and 35Cl(n,α)32P neutron-capture reactions were exploited. For this reason, there are CLYC scintillators enriched with more than 99 % of 7Li, suitable for fast neutron detection and CLYC scintillators enrich with 95% of 6Li, suitable for thermal neutron detection. The energy of the outgoing proton or α particle scales linearly with the incident neutron energy. In this work, the internal background was measured and discriminated from the natural background using different CLYC crystals (1" x 1", 2" x 2" and 3" x 3" and different Li ion enrichment). The pulse shape discrimination was used to disentangle the gamma rays and particle in the background measurement. A small alpha contamination was observed and estimated in the different CLYC samples, it was also compared with the typical neutron rate in a nuclear physics experiment. Furthermore, the possibility to measure continuous neutrons spectra is an interesting feature for nuclear physics experiment. The preliminary tests on a 7Li enrich 2" x 2" CLYC will be also presented, because they are important for the future possibility to build an array of 3" x 3" CLYC scintillators, suitable for nuclear physics experiments.

Primary author: GIAZ, Agnese (INFN sezione di Milano)

Co-authors: Dr MILLION, Bénédicte (INFN - Milano); Dr CAMERA, Franco (INFN sezione di Milano)