Contribution ID: 170

Type: Poster presentation

Neutron-Induced Radiation Damage in BaF2, LYSO and PWO Crystals

Wednesday 20 September 2017 10:38 (1 minute)

One crucial issue for applications of scintillation crystals in future HEP calorimeters is radiation damage in severe radiation environment, such as at the HL-LHC. While radiation damage induced by ionization dose in inorganic crystal scintillators is well understood, investigations are on-going to understand radiation damage caused by hadrons, including both charged hadrons and neutrons. In this paper, we report an investigation on neutron induced radiation damage in BaF2, LYSO and PWO crystals irradiated at the Weapons Neutron Research facility of Los Alamos Neutron Science Center (WNR of LANSCE). Three groups of LYSO plates (6/each) of $14 \times 14 \times 1.5$ mm3 were irradiated by fast neutron (>1 MeV) fluences of 2.2, 10 and 21 × 1014 n/cm2 respectively for 13.4, 54.5 and 118 days in 2015. The results show excellent radiation hardness of LYSO crystals against fast neutron. To address the issue of γ -ray background, three groups of 5 mm thick BaF2, LYSO and PWO plates with and without Pb shielding were irradiated to similar fluence. Degradations in both transmittance and light output are reported and compared to the damage induced by γ -rays and protons only.

Has accepted

Authors: Dr HU, Chen (California Institute of Technology); YANG, Fan (Caltech); ZHANG, Liyuan (California Institute of Technology (US)); ZHU, Ren-Yuan (California Institute of Technology (US)); KAPUSTINSKY, jon (los alamos national laboratory); Dr NELSON, Ron (LANL); WANG, Zhehui (Los Alamos National Laboratory)

Presenter: ZHANG, Liyuan (California Institute of Technology (US))

Session Classification: Poster Session 2

Track Classification: Defect and radiation damage