Contribution ID: **36** Type: **not specified**

Optically stimulated luminescence in state-of-the-art LYSO:Ce scintillators

Saturday, June 4, 2022 9:15 AM (15 minutes)

In this contribution we extend the current understanding of the different energy-transfer mechanisms present in state-of-the-art Lu(2−x)YxSi2O5:Ce scintillators. We present results of a photon emission mechanism known as optical stimulated luminescence (OSL), able to efficiently trap a fraction of the energy deposited in the material. OSL competes with the non-radiative energy transfer to luminescent centers responsible for the scintillation pulse and it is estimated to have a yield below 1000 ph/MeV. We use spectrally and temporally resolved OSL readout to characterize such process and show that OSL makes use of the same Ce3+ luminescent centers that were engineered for the scintillation. While OSL degrades the intrinsic scintillating performance by reducing the amount of photons emitted following the passage of ionizing radiation, it is able to encode highly resolved spatial information of the particles's interaction point. A proof of concept readout yielding sub-1mm^3 spatial resolution is demonstrated using a cubic LYSO crystal to image dose profiles and the attenuation length of 511 keV gamma photons.

Primary author: MARTINEZ TURTOS, Rosana (Aarhus University (DK))

Co-authors: Mr JENSEN, Mads (Aarhus University); Prof. JULSGAARD, Brian (Aarhus University); Prof. BALLING, Peter (Aarhus University)

Presenter: MARTINEZ TURTOS, Rosana (Aarhus University (DK))

Session Classification: Technologies for ≤100ps TOFPET resolution: Scintillators

Track Classification: Technologies: Scintillators