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## Parametric Evaluation of New Fast Neutron Scintillator Designs

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Experiments conducted at Idaho National Laboratory (INL) measured the performance of prototype fast neutron scintillator screens with various scintillator materials deposited in a range of thicknesses on high density polyethylene (HDPE) of varying thickness. The HDPE acts as a converter for the fast neutrons, utilizing a proton recoil reaction to cause the scintillator material to emit photons. INL's Neutron Radiography (NRAD) Reactor's North Radiography Station (NRS) beamline has a fast neutron flux (above 1 MeV) greater than  $1.5 \times 10^7$  n/cm<sup>2</sup>s. This study determined which combination of scintillator material and thickness, as well as which HDPE thickness, exhibited the best screen performance for fast neutron imaging based on light output and spatial resolution. The results of these measurements inform development of higher detection quantum efficiency screens for fast neutron imaging.

**Primary authors:** Mr CHUIRAZZI, William (Idaho National Laboratory); Dr CRAFT, Aaron (Idaho National Laboratory); Mr OKSUZ, Ibrahim (The Ohio State University); Dr COOL, Steven (DMI/Reading Imaging); Dr SCHILLINGER, Burkhard (Heinz Maier-Leibnitz Zentrum (FRM II))

**Presenter:** Mr CHUIRAZZI, William (Idaho National Laboratory)

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