

Pressurized xenon as scintillator for gamma spectroscopy

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Xenon detectors have been used and are in use for a number of applications, in particular for the detection of gamma rays. They are also preeminent in the field of Dark Matter searches, neutrinoless double beta decay and searches of rare processes.

Xenon is an attractive material for gamma ray detection, in particular thanks to its high atomic number and, as a consequence, large cross-section for photoelectric absorption.

While a number of works presenting high-pressure Xe ionization chambers can be found in the literature, very few are available that discuss the properties of high-pressure Xe as a scintillator.

In this talk I will present the experimental study of the properties of high-pressure Xe as a scintillator, in the context of developing a gamma ray detector for the detection of Special Nuclear Materials.

Our first goal has been to study experimentally the light yield and energy resolution from a high-pressure Xe tube, studying the dependence on thermodynamic conditions as well.

We measured a light yield near 2 photoelectrons per keV for xenon at 40 bar and an energy resolution of about 9% (FWHM) at 662 keV.

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