

Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Novelty of HPGe detector for direct detection of geo-neutrinos¹

MATHBAR RAUT, DONGMING MEI, SANJAY BHATTARAI, Univ of South Dakota — Geo-neutrinos are the messengers to carry information about the interior of the Earth. Detecting geo-neutrinos is an important tool to probe the earth interior heating properties and the composition of the core of the earth. Neutrino-nucleus coherent scattering and neutrino-electron scattering are two promising methods to detect geo-neutrinos from Potassium-40, Uranium-238, and Thorium-232. Researchers have tried to detect them by using silicon, argon, water, lithium, and cadmium as target nucleus. Due to their relatively higher recoil threshold, we are still far away to detect the geo-neutrinos from Potassium-40 and Thorium-232. However, high purity germanium detector might be a novel candidate for this task primarily for two reasons. First, germanium detectors possess potential to achieve extremely low detection threshold with internal charge amplification technology. Second, it has extremely fine energy resolution which helps for better pulse shape analysis of the signals. In this paper, we present a conceptual idea on the amount of high purity germanium detector needed to detect geo-neutrinos from Potassium-40 and Thorium-232 directly over the vast backgrounds of solar neutrinos.

¹NSF OISE-1743790

Mathbar Raut
Univ of South Dakota

Date submitted: 26 Jun 2020

Electronic form version 1.4