Contribution ID: **28** Type: **Poster**

CYGNUS studies of Angular Resolution of Electron Recoils in Gas

Wednesday, May 11, 2022 3:48 PM (1 minute)

The CYGNUS collaboration is composed of several directional recoil detection research groups that are proposing a large-scale experiment with a network of directional detectors dispersed globally. This experiment is attractive in the context of dark matter searches because it can penetrate the neutrino floor and has a practical way of confirming the galactic origin of a detected nuclear recoil signal. Recently, there has been a realization that directional recoil detectors also offer a unique ability to do neutrino physics; a particularly interesting example is the possibility of obtaining a firm measurement of the Sun's CNO neutrino flux. Given the direction to the Sun and the combined measurement of recoil energy and direction, event-by-event reconstruction of the neutrino energy spectrum is possible. The electron recoil channel is particularly promising because the kinematics result in higher recoil energies at a given neutrino energy. Evaluating and optimizing the CYGNUS sensitivity to neutrinos requires a good understanding of the detector's energy resolution and the angular resolution of electron recoils. However, electron recoils have complex trajectories and the angular resolution that can be achieved is not well understood. We discuss a general method for approximating and optimizing the angular resolution of electron recoils in gas time projection chambers. We will also show specific examples of the expected directional performance in CYGNUS detectors, including the CYGNO optical readout detector currently being commissioned underground at Gran Sasso.

Primary author: GHREAR, Majd (University of Hawaii)

Presenter: GHREAR, Majd (University of Hawaii)

Session Classification: Poster Session

Track Classification: Supernova & Solar Neutrinos