

CYGNUS-HD: The U.S. Directional Recoil Detection Effort

Work on directional (nuclear and electron) recoil detection in the U.S. includes gaseous time projection chamber (TPC) efforts focused on increasing imaging performance in the low-energy regime, applicable for directional dark matter searches. Both high-definition charge and optical readouts coupled with gas electron multiplier (GEM) amplification stages have the ability to directionally reconstruct events below ≈ 10 keV. Use of negative ion gas mixtures results in lower diffusion in the drift region than obtained with electron-drift gases, which further increases performance. Multiple U.S. R&D efforts within the broader CYGNUS consortium will be discussed.

Primary author: THORPE, Tom (LANL)

Presenter: THORPE, Tom (LANL)

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