

CYGNUS: Rare event searches with directional TPCs

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Directional and particle identification capabilities can play a critical role in rare event searches, and it becomes especially challenging when very low energy thresholds need to be reached. Large gaseous detectors with high granularity readout could represent a groundbreaking solution, by combining detectable flight length at low recoil energy, very good discrimination between nuclear and electronic recoils and the possibility of tuning the gas mixture to improve the sensitivity to specific processes and energy ranges. The CYGNUS community is exploring several different technological solutions for the detection of nuclear recoils from light dark matter in gaseous TPCs with high granularity readout. It will also open a new path for the detection of coherent neutrino scattering, with the additional capability of reconstructing electron recoils from elastic neutrino scattering. The different options under study and the status of the ongoing experimental tests will be reviewed.

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