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The CYGNUS project

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The CYGNUS proto-collaboration aims to establish a Galactic Directional Recoil Observatory at the ton-scale that could test the DM hypothesis beyond the Neutrino Floor and measure the coherent and elastic scattering of neutrinos from the Sun and possibly Supernovae. A unique capability of CYGNUS will be the detailed measurement of topology and direction of low-energy nuclear and electron recoils in real time. Other key features of CYGNUS are modular, recoil sensitive TPCs (electron and/or negative ion drift operation) filled with a Helium-Fluorine based gas mixture at atmospheric pressure for sensitivity to low WIMP masses for both Spin Independent and Spin Dependent couplings. Installation in multiple underground sites (including the Southern Hemisphere), with a staged expansion, is foreseen to mitigate contingencies, minimise location systematics and improve sensitivity. We will review the key features and expected physics reach of CYGNUS, and the programs currently underway in the collaboration laboratories to optimise gas mixture, technologies and algorithms towards the realisation of this concept.

Submitted on behalf of a Collaboration?

No

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