

# **CYGNO, an optically readout TPC for low energy events study**

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The CYGNO collaboration is realising a TPC operating at atmospheric pressure, in which the secondary scintillation of a triple-GEM stack is acquired by a system consisting of Active Pixel Sensors based on sCMOS technology, with more than 4 million pixels each, and fast photo-multipliers. This technology provides information such as the released energy and its spatial profile, 3D direction and 3D position that makes it possible to reconstruct and identify the ionisation produced in the gas by electronic or nuclear recoils with energies down to a few keV.

In this presentation we will describe the operation of our 50-litre prototype (LIME) in the underground laboratories of the Gran Sasso, which represents the largest prototype developed by CYGNO to date, focusing in particular on studies relating to the identification of low-energy interactions. We also discuss some of the R&D carried out to maximise CYGNO's potential, including the study of hydrogen-based mixtures and the recent achievement of atmospheric pressure negative ion drift operation with optical readout, carried out in synergy with the ERC's INITIUM project.

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