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50 litres TPC with sCMOS-based Optical Read Out for the CYGNO project

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The CYGNO project aims at realising a 1 cubic meter gaseous Time Projection Chamber (TPC) equipped with a Scientific CMOS (sCMOS) commercial cameras to optically readout Gas Electron Multiplier (GEM) to be operated at the underground Laboratories of Gran Sasso (LNGS).
The purpose of the project is to study the technology needed for a larger size gaseous TPC (30-100m^3) operated at atmospheric pressure for the directional search of low mass O(GeV) dark matter and low energy (eg solar) neutrinos astronomy. The roadmap of the project foresees the installation of a 50 litres TPC prototype, called LIME, the largest TPC realised with this technology, fully equipped with copper and water shielding. LIME is equivalent to about a 1/20 of the CYGNO demonstrator and aims to validate: the construction materials, the Monte Carlo simulations, the data reconstruction and particle identification performances at low energy threshold. LIME is under installation at the LNGS and it is supposed to start data taking at the beginning of 2022. The detector description and installation will be presented, as well as the overground performance and limitations that require underground characterisation, and, hopefully, the first results at LNGS.

Primary experiment

CYGNO

Primary authors: MAZZITELLI, Giovanni (INFN); ABRITTA, Igor; DOMINGUES AMARO, Fernando (Department of Physics, University of Coimbra); BARACCHINI, Elisabetta (Gran Sasso Science Institute); BENUSSI, Luigi (INFN e Laboratori Nazionali di Frascati (IT)); BIANCO, Stefano (INFN e Laboratori Nazionali di Frascati (IT)); CAPOCCIA, Cesidio (INFN e Laboratori Nazionali di Frascati (IT)); CAPONERO, Michele (INFN e Laboratori Nazionali di Frascati (IT)); CAVOTO, Gianluca (Sapienza Universita e INFN, Roma I (IT)); DANE, Emiliano (LNF-INFN); DHO, Giorgio (INFN - National Institute for Nuclear Physics); DI MARCO, Emanuele (INFN, Roma 1 (IT)); D'IMPERIO, Giulia (Universita di Roma I 'La Sapienza'-Universita e INFN, Roma I); DI GIAMBATTISTA, Flaminia (Gran Sasso Science Institute); MARCELO GREGORIO, Robert Renz (University of Sheffield); IACOANGELI, Francesco (Sapienza Universita e INFN, Roma I (IT)); PESSOA LIMA JUNIOR, Herman (Instituto de Fisica); SILVA LOPES JÚNIOR, Amaro (Faculdade de Engenharia, Universidade Federal de Juiz de Fora); MACCARRONE, Giovanni (INFN e Laboratori Nazionali di Frascati (IT)); PASSOS MANO, Rui Daniel (LIBPhys, Department of Physics, University of Coimbra); MARAFINI, Michela (INFN Roma1 - Centro Fermi); MCLEAN, Alasdair (Department of Physics and Astronomy, University of Sheffield); RODANO, Aleksej (LNF-INFN); RUSSO, Alessandro (INFN e Laboratori Nazionali di Frascati (IT)); MESSINA, Andrea (Sapienza Universita e INFN, Roma I (IT)); PRAJAPATI, Atul (Gran Sasso Science Institute); RIGGIO, Chiara (La Sapienza Univerista' di Roma - LNF-INFN); PIERLUIGI, Daniele (INFN e Laboratori Nazionali di Frascati (IT)); MARQUES, David (Gran Sasso Science Institute); PICCOLO, Davide (INFN e Laboratori Nazionali di Frascati (IT)); PINCI, Davide (Sapienza Universita e INFN, Roma I (IT)); TOZZI, Donatella (La Sapienza Universita' di Roma - LNF-INFN); ROSATELLI, Filippo (INFN e Laboratori Nazionali di Frascati (IT)); RENGA, Francesco (INFN Roma); SAVIANO, Giovanna (INFN e Laboratori

Nazionali di Frascati (IT)); LOPES, Guilherme Sebastião Pinheiro (Universidade Federal de Juiz de Fora); MARQUES FERREIRA DOS SANTOS, Joaquim (Universidade de Coimbra (PT)); SPOONER, Neil (University of Sheffield); ANTONIETTI, Rita (LNF-INFN e Roma3); DA CRUZ ROQUE, Rita Joana (Department of Physics, University of Coimbra); TESAURO, Roberto (LNF-INFN); TORELLI, Samuele (Gran Sasso Science Institute); TOMASSINI, Sandro (INFN - National Institute for Nuclear Physics); PIACENTINI, Stefano (Università La Sapienza); BERNARDES MONTEIRO, Cristina (University of Coimbra); ANTUNES NOBREGA, Rafael (Juiz de Fora Federal University (BR)); FONSECA PANIS, Igor (Faculdade de Engenharia, Universidade Federal de Juiz de Fora); PAOLETTI, Emiliano (INFN-LNF); PASSAMONTI, Luciano (Istituto Nazionale Fisica Nucleare (IT)); PELOSI, Alessandro (Sapienza Universita e INFN, Roma I (IT)); PETRUCCI, Fabrizio (Universita e INFN Roma Tre (IT)); PIACENTINI, Francesco (INFN - National Institute for Nuclear Physics)

Presenter: MAZZITELLI, Giovanni (INFN)

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