



# CYGNNO

*as an International Collaboration*








## **Collaborative Agreement**

The presence of DM in the Universe is nowadays an established, yet still mysterious, paradigm: deciphering its essence is one of the most compelling tasks for fundamental physics today. Direct DM searches look for very low energy (1-100 keV) nuclear recoils due to the elastic scattering of Weakly Interactive Massive Particles (WIMPs) in the active volume of the detector. The expected WIMP scattering is due to the Earth's relative motion with respect to the galactic halo, that is believed to contain high concentration of DM from measurement of the rotational curves of our Galaxy. This implies that an apparent WIMP wind coming from the Cygnus constellation (the direction towards which our Solar system is travelling in its rotation around the center of the Galaxy) is expected to be observable on our planet. While technologically challenging, the determination of the incoming direction of DM particles can offer not only additional handles for discrimination of the annoying backgrounds, but especially an unique key for a positive, unambiguous identification of a DM signal.

*To be reviewed on an annual basis*

*If necessary, can be amended by agreement of the PIs and Spokespersons before such deadline*




-  **Strengthen our collaboration towards the realisation and operation of **CYGN0 PHASE 1** experiment at LNGS together**
-  **Without the necessity for national agencies or Universities to have a formal agreement **for the moment****
-  **To get additional **fundings****
-  **To sign **papers** together**
-  **To further boost the **directional DM case** in the international scientific community**

- 📌 **Best effort basis**
- 📌 **Individually and separately funding the research dedicated to CYGNO**
- 📌 **Specific contribution agreed upon collectively, along the research lines already pursued by each group**
- 📌 **Editorial & Speaker board with one member per group?**
- 📌 **Periodic meetings to discuss new developments**
  - 📌 **Which date/time once a month would suits you better for this?**

- 📌 **Free and unfettered access to all data taken with CYGNO prototypes and CYGNO PHASE 1**
- 📌 **Co-authored papers in alphabetic order by all undersigned members after 6 months from signing**
  - 📌 **6 months rule do not apply if the article contains significant personal contribution**
  - 📌 **List of authors completed each 6 months by PIs**
- 📌 **All undersigned member can give talks on behalf of CYGNO, following Editorial & Speaker board rules**

# Groups specific contributions

## **UK - Sheffield University**

-  Gas recirculation and purification
-  sCMOS cameras, plexiglass and Cu screening
-  Know-how in underground installation & operation



## **Brasil - University Juiz da Fora & Brazilian Center of Physics Research**

-  sCMOS cameras and PMT readout development
-  Data acquisition and trigger development
-  sCMOS sensors simulation



## **USA - University of New Mexico**

-  Gas studies for scintillating negative ion mixtures



## **Portugal - University of Coimbra (LIBPhys)**

-  Gas studies for scintillating mixtures ?
-  Innovative GEM structures ?

*Still to be discussed  
Meeting today at 15.00*



*All groups already agreed to sign our upcoming CYGNO paper*