

# THE CYGNO EXPERIMENT

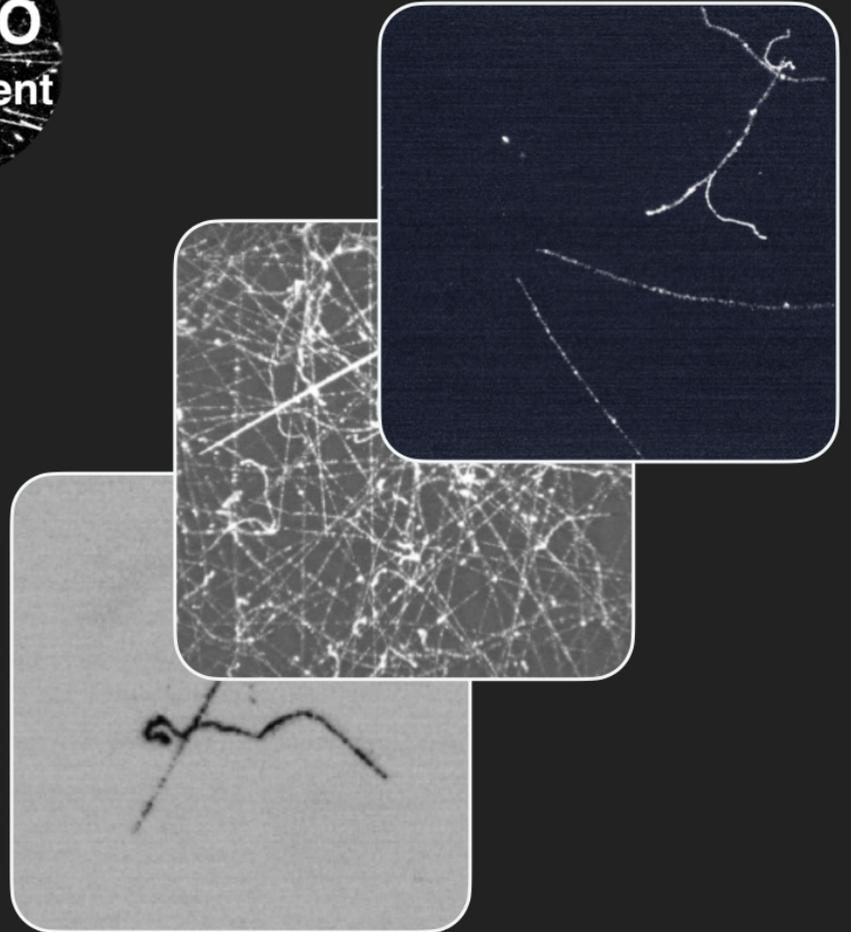


MELBA D'ASTOLFO

On behalf of the CYGNO collaboration

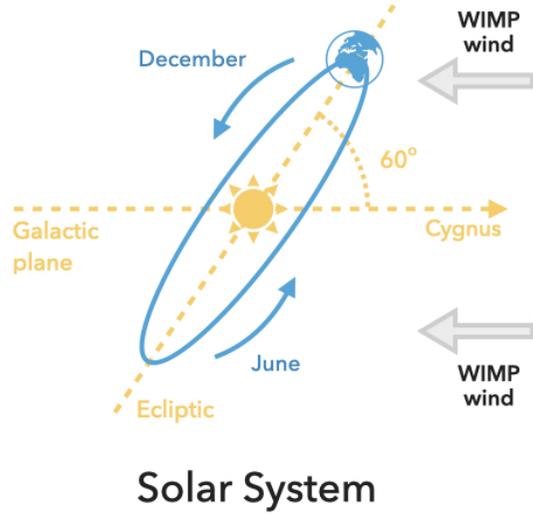
Gran Sasso Science Institute

[melba.dastolfo@gssi.it](mailto:melba.dastolfo@gssi.it)

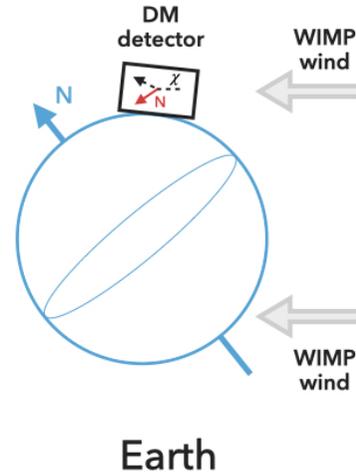




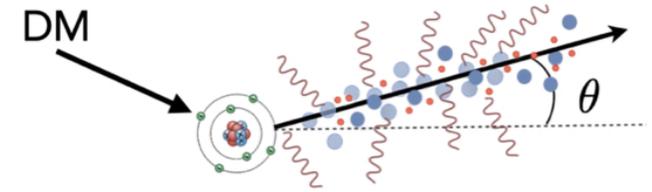
Our galaxy



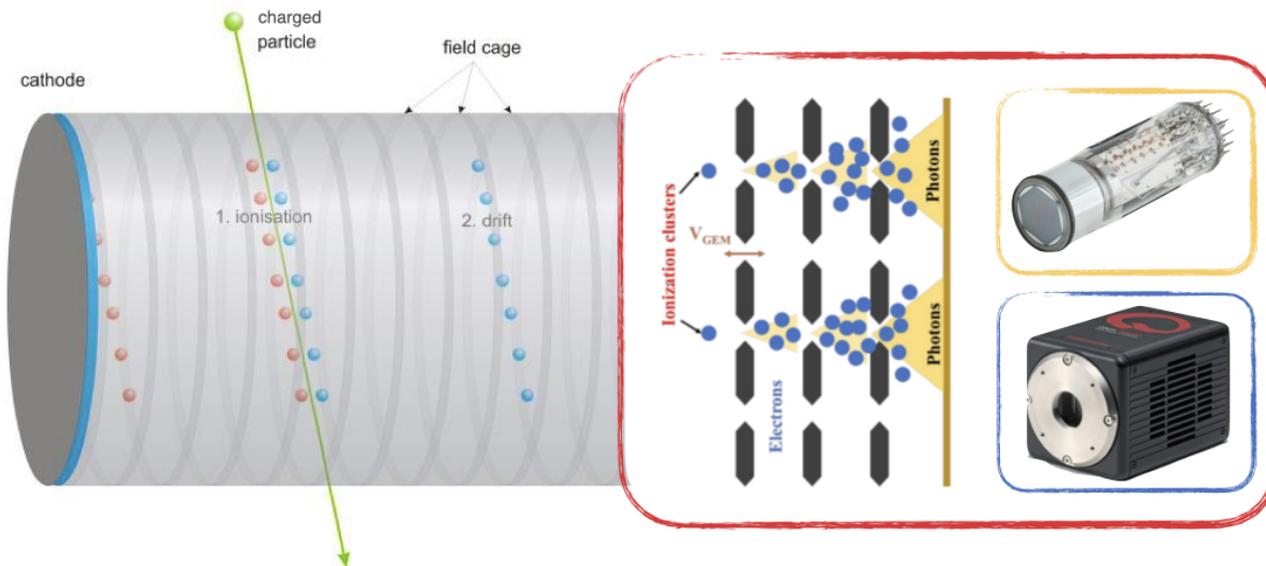
Solar System



Earth

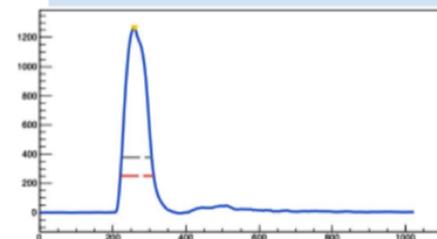


DM Detector

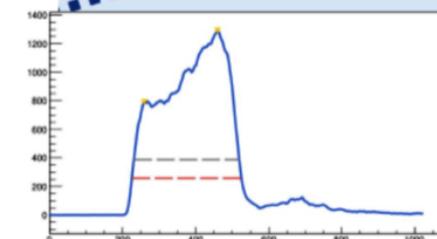


## Integrated z + Energy

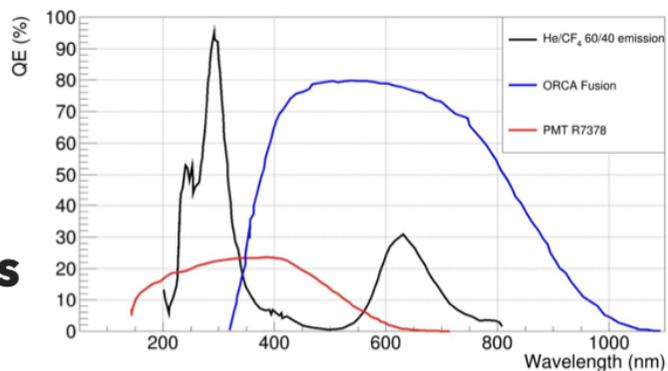
Straight track



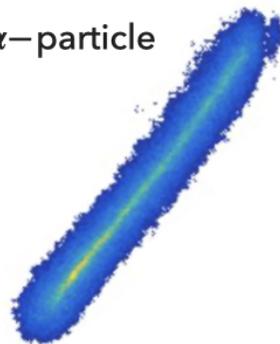
Tilted track

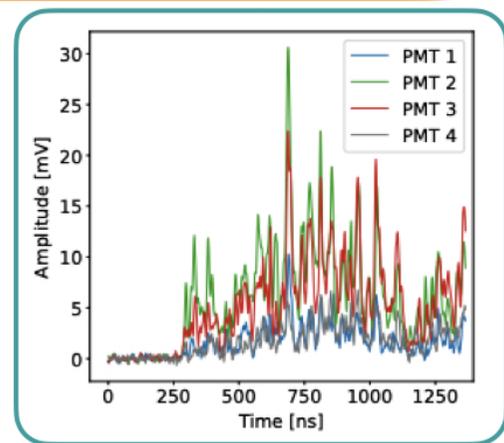
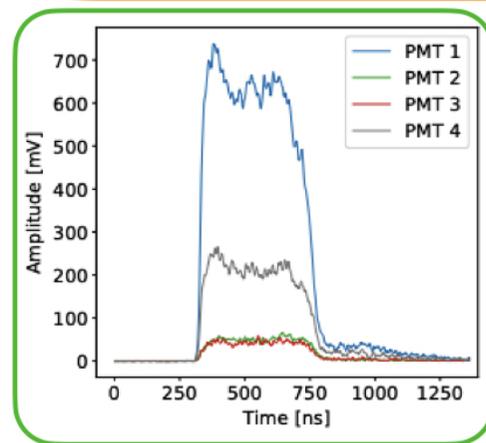
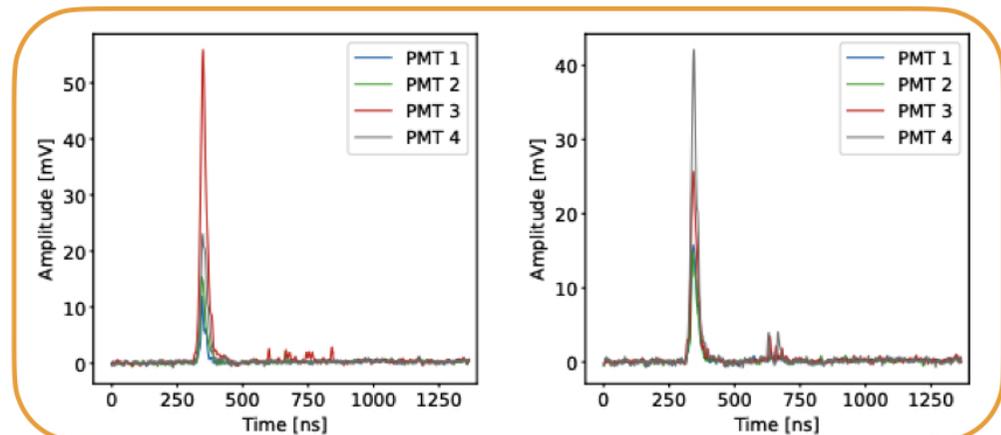
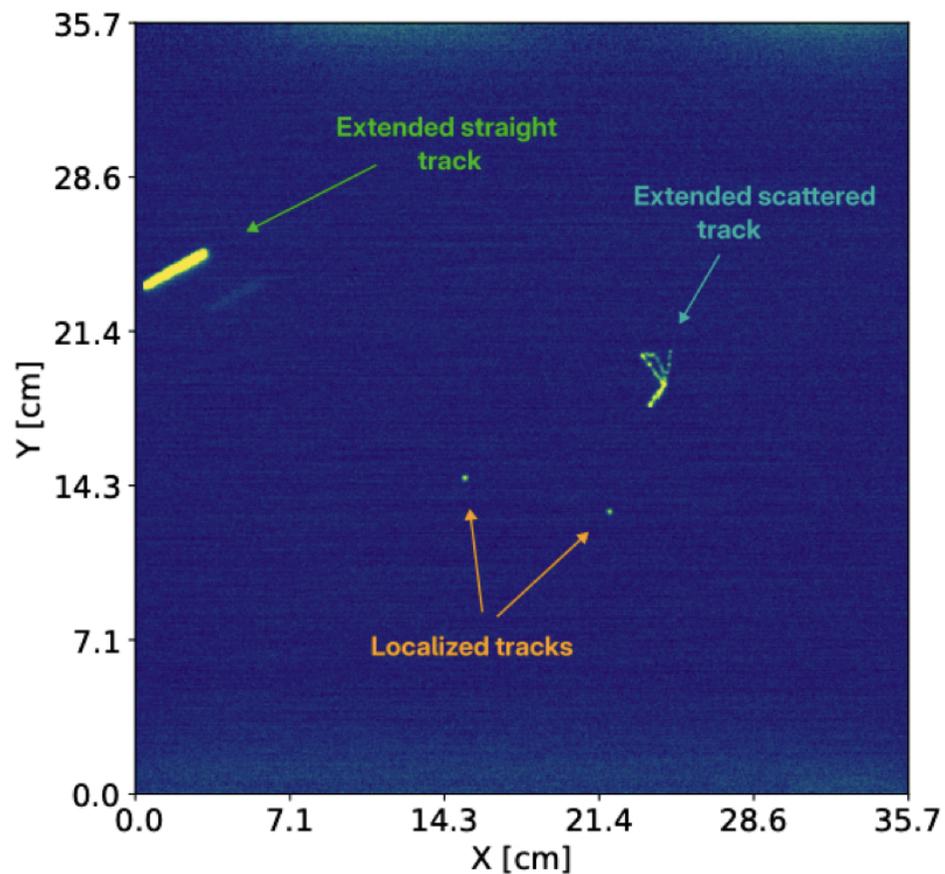


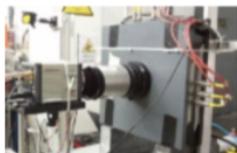
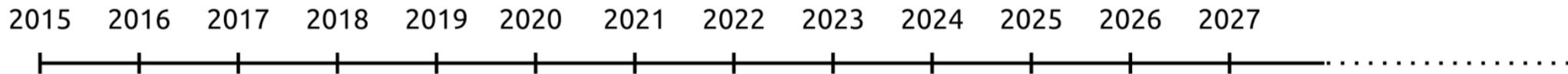
Energy + X & Y coordinates



$\alpha$ -particle



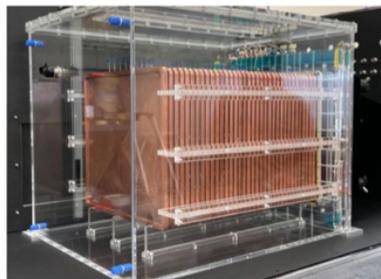




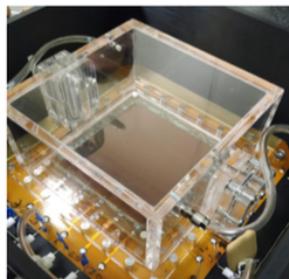
- ⊙ 1 cm drift



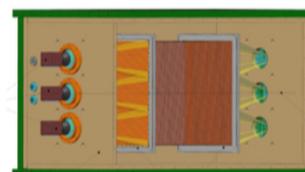
- ⊙ 3D printed
- ⊙ 20 cm drift



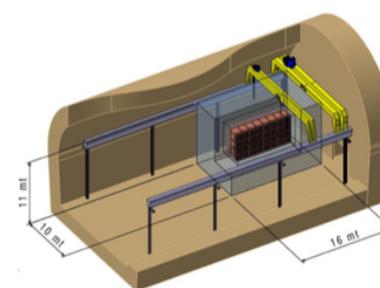
- ⊙ 50 cm drift
- ⊙ Underground tests
- ⊙ MC validation



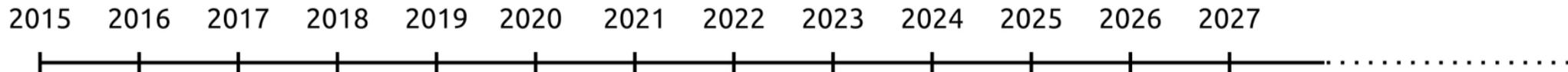
- ⊙ 1 – 20 cm drift
- ⊙ Different GEMs
- ⊙ Electroluminescence
- ⊙ Negative Ions



- ⊙ Background
- ⊙ Material tests
- ⊙ Gas purification
- ⊙ Shielding
- ⊙ Scalability



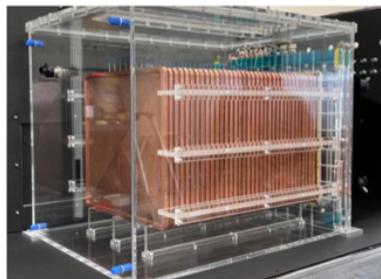
- ⊙ Dark Matter searches
- ⊙ Neutrino spectroscopy



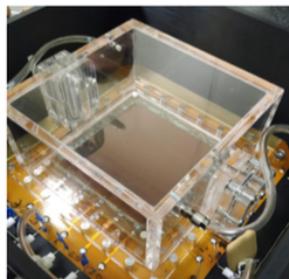
- ⊙ 1 cm drift



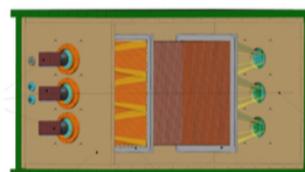
- ⊙ 3D printed
- ⊙ 20 cm drift



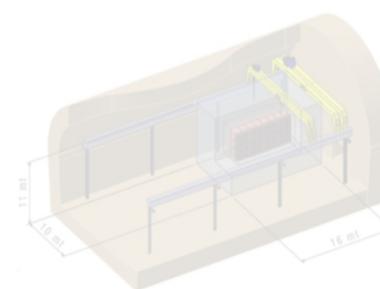
- ⊙ 50 cm drift
- ⊙ Underground tests
- ⊙ MC validation



- ⊙ 1 – 20 cm drift
- ⊙ Different GEMs
- ⊙ Electroluminescence
- ⊙ Negative Ions

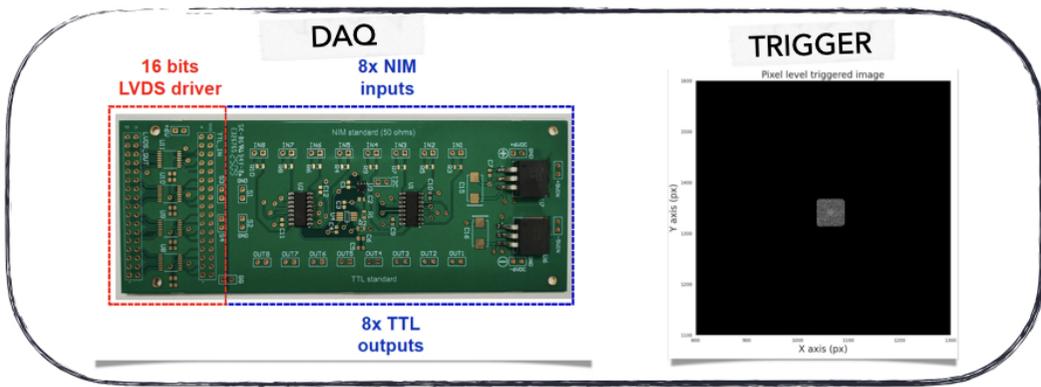


- ⊙ Background
- ⊙ Material tests
- ⊙ Gas purification
- ⊙ Shielding
- ⊙ Scalability

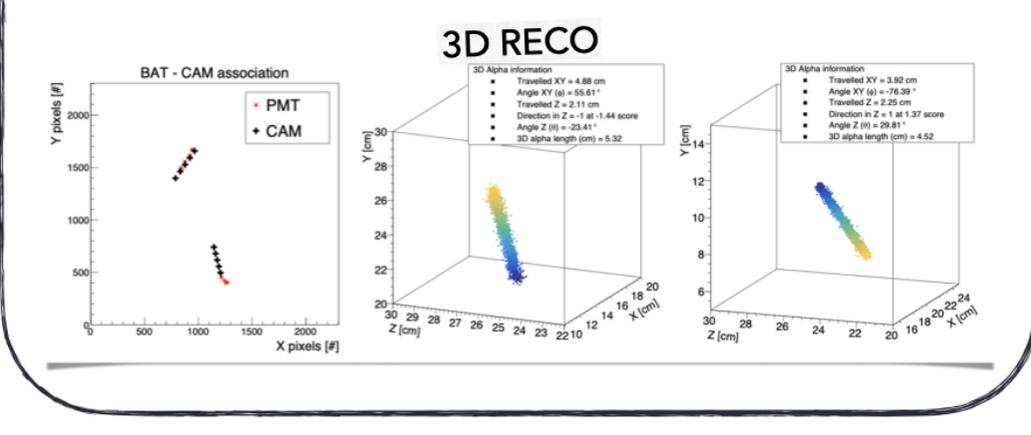
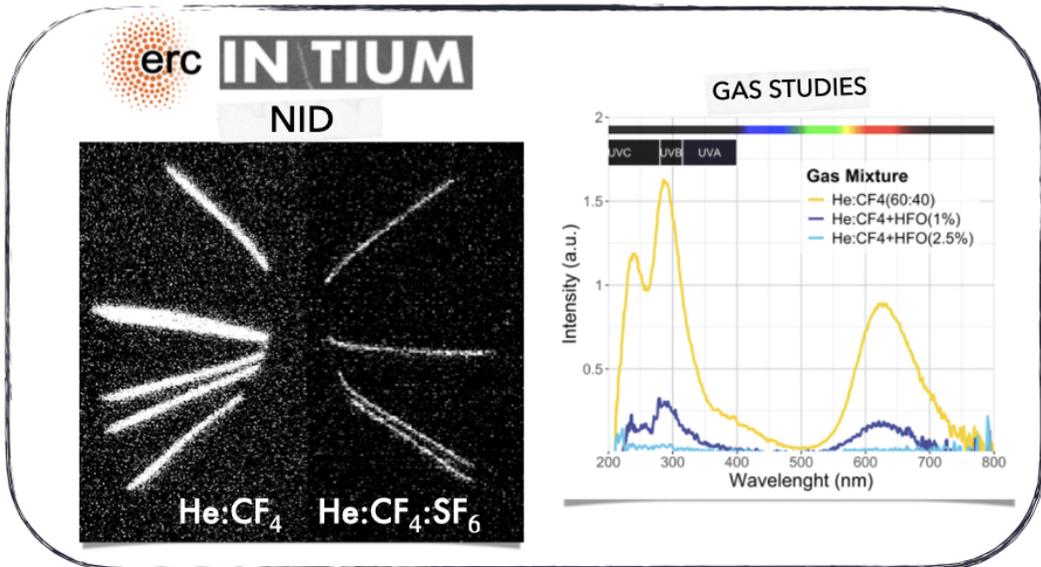
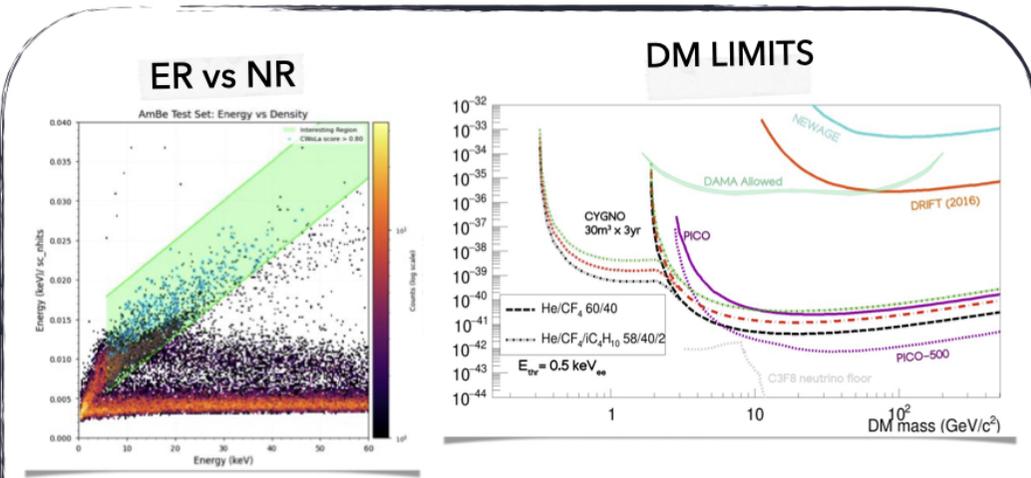


- ⊙ Dark Matter searches
- ⊙ Neutrino spectroscopy

CYGN0\_04 DAQ & COMMISSIONING



LIME DATA ANALYSIS 



MANGO - R&D

0

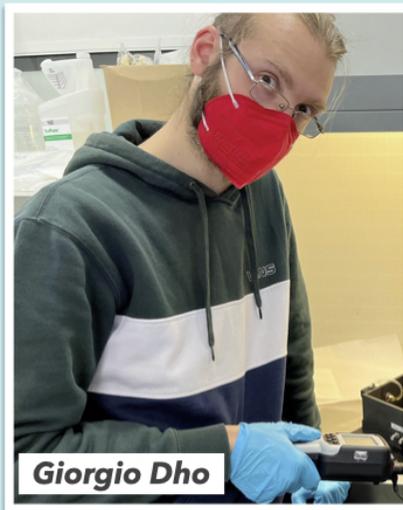


**Prof. Elisabetta Baracchini**

- BaBar
- MEG
- ERC: INITIUM (NID)
- DM, TPCs, MPGDs, ...



1



**Giorgio Dho**

- CYGNO DM sensitivity
- Light yield enhancement
- Optics
- NID



2



**Atul Prajapati**

- Data/MC comparison
- Simulation



- Track reconstruction
- PID with ML



**Flaminia Di Giambattista**

- Directionality
- Feasibility of neutrino searches with CYGNO-30



**Samuele Torelli**

**3**

- Maxwell simulations
- DAQ / Detector operation
- PMT reconstruction / 3D
- NID (PMT)

**4**

- GEMs
- Polarimetry
- Neutron simulation
- PMT/CMOS association
- CYGNO\_04 background simulation

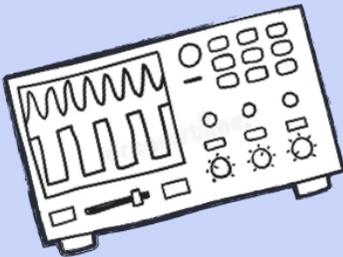
**5**

- LIME operations
- Analysis (PMT and camera)
- DAQ
- Sensitivity projections and limit setting



**6**

- Commissioning of CYGNO-04
- DAQ of CYGNO-04
- NID

**6**

- Background model
- Detector response model
- Simulation
- Data/MC comparison

**6**

- LIME sensitivity to DM and CYGNO limit setting tool
- Directionality
- ER/NR discrimination
- Neutrinos

