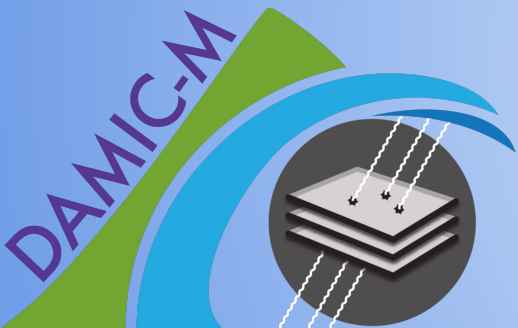


Light Dark Matter searches with the DAMIC-M experiment



Instituto de Física de Cantabria

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS



Universidad
de Cantabria

PhD student:
Carlos Centeno Lorca

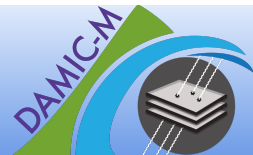
Supervisors:
Núria Castelló Mor
Bradley Kavanagh

Research plan

This phd project is divided in three main parts

- Participation in the CCD characterisation campaign.
 - Participation in the commissioning of the DAMIC-M CCDs. (starting in July)
 - Participation in the construction of the detector.
- Participation in the data analysis.
 - Participation in the DM-electron scattering group: Daily modulation and Solar Reflected DM, mainly
 - Other analysis as background calibration, nuclear recoil ionisation efficiencies, etc
- Extending the phenomenology of light Dark Matter.
 - Modelling of unconventional DM signals.

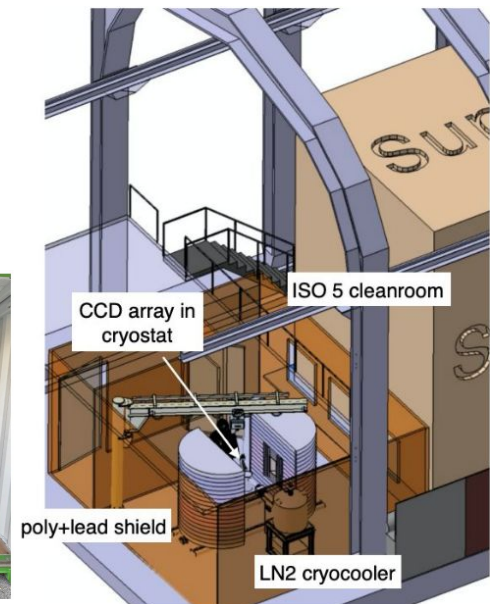
DARk Matter In CCDs at Modane



The experiment is located at the **Laboratoire Souterrain de Modane (LSM)**.

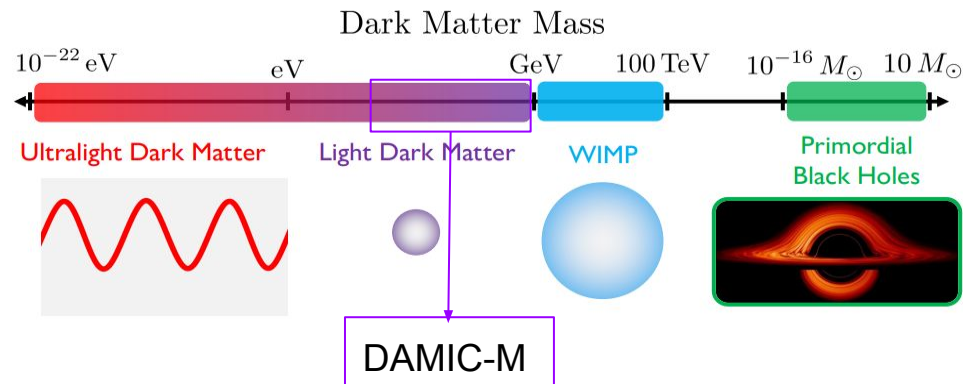
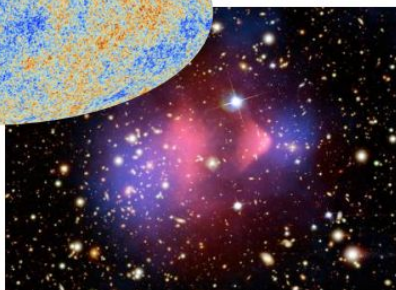
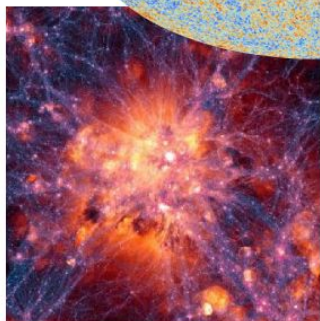
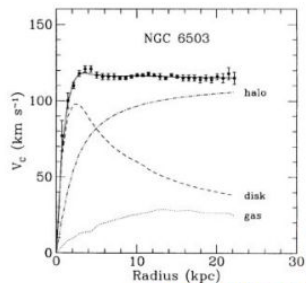
Physics goals:

- Detect **Light DM** (WIMP, hidden sector) signals via interaction with Si nucleus or e^- in the bulk of **Skipper CCDs**.
- Achieve **<1 dru** background rate (1 differential rate unit = 1 event/keV/kg/day).
- Operate ionization detector with **O(eVee) threshold**.



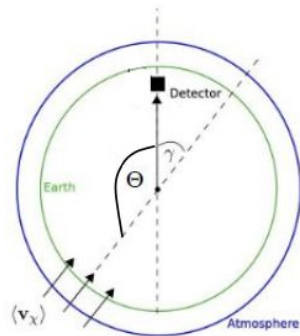
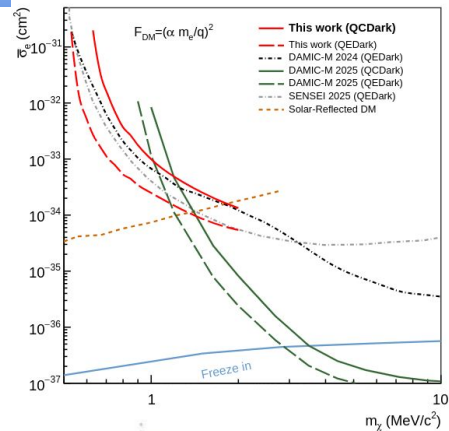
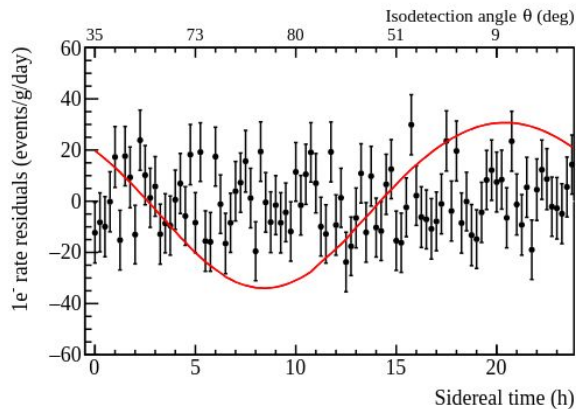
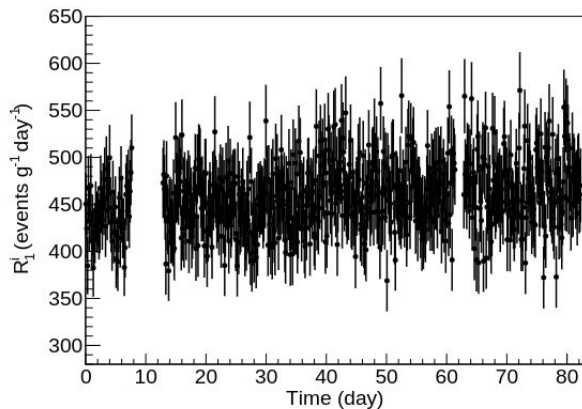
The search for light Dark Matter

Plenty of evidence for Dark Matter



DM searches: Daily modulation

- Time dependent analysis to look for a daily modulated DM signal above an unmodulated background.
- Data must be stable to perform this analysis
- Improves the exclusion limits of the SHM analysis for DM-electron scattering.
- **New paper coming soon!!!**



DM signal simulated
with the VERNE code

