



Study on low energy events in liquid argon for dark matter searches

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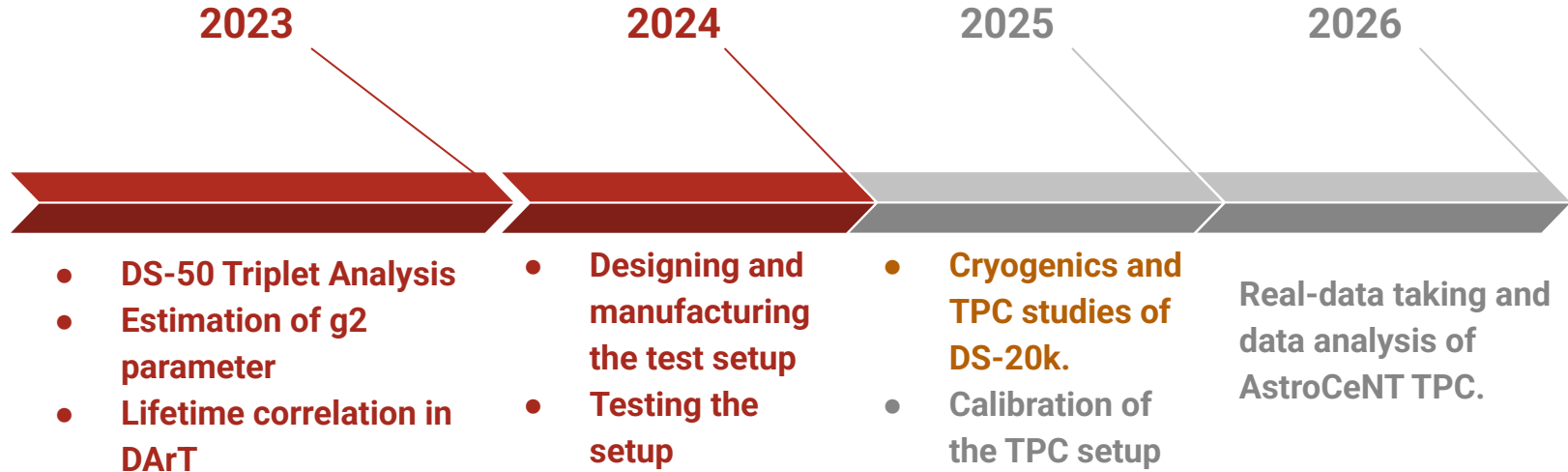


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PhD journey so far...

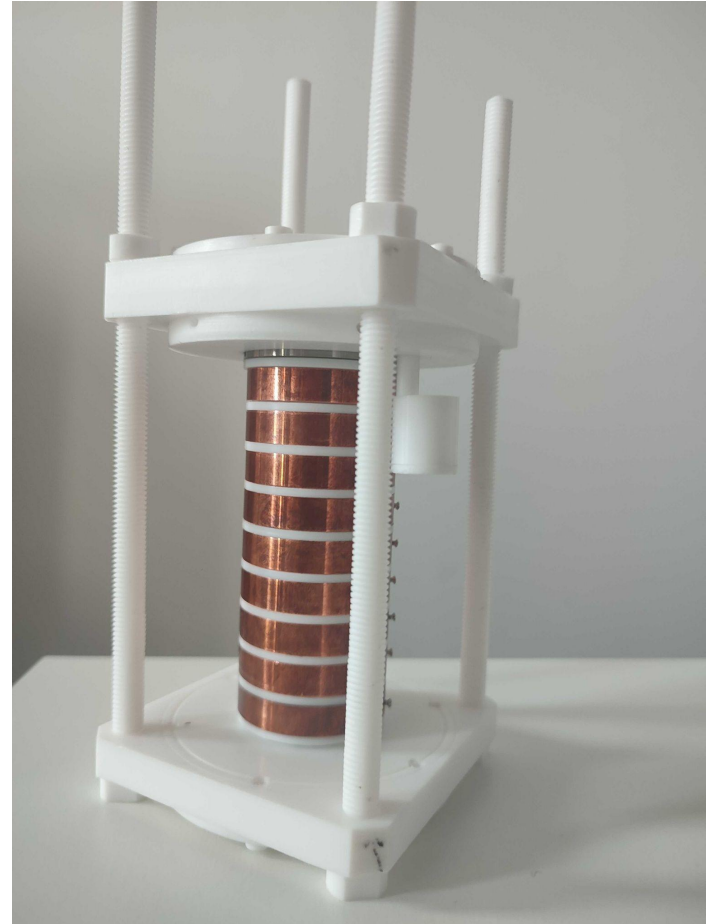
Development of AstroCeNT dual-phase Time Projection Chamber (TPC) for low-mass DM searches



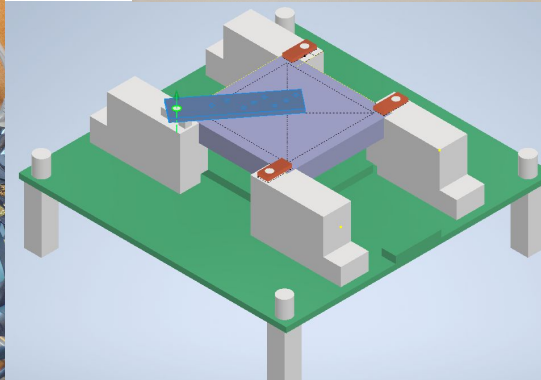
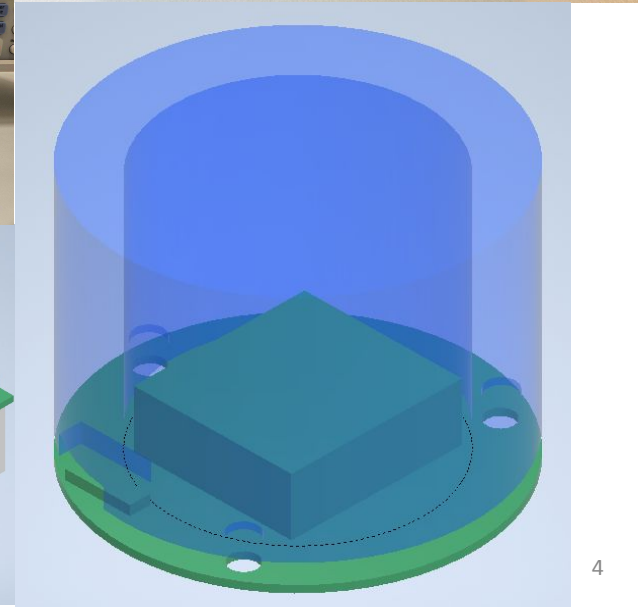
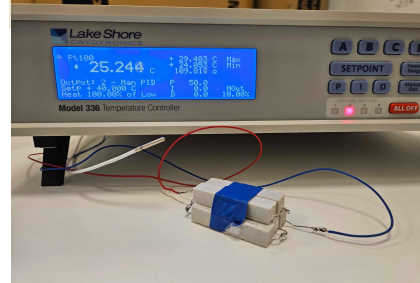
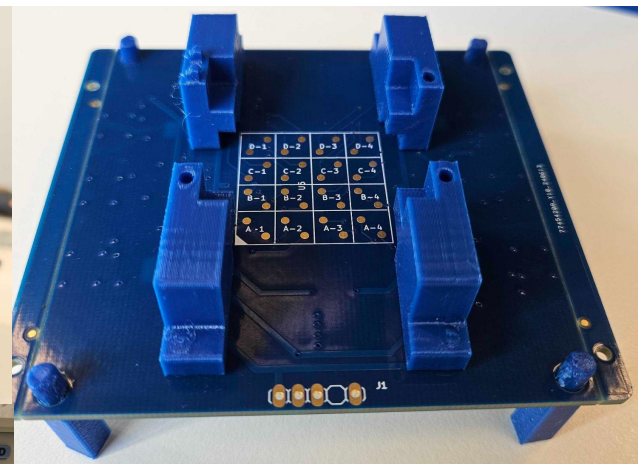
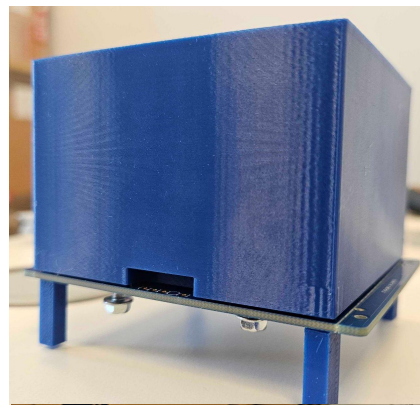
Report on 2024:

1. Development of AstroCeNT dual-phase TPC for low-mass DM searches.
2. Cryogenics and TPC studies of DS-20k Mockup experiment

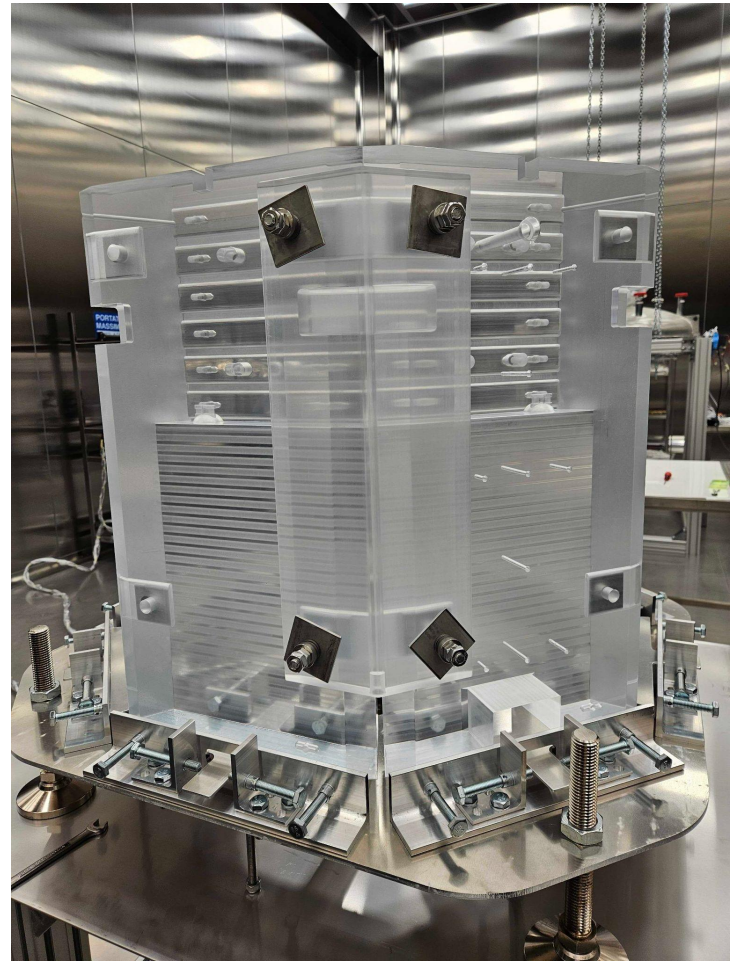
Progress report on the development of AstroCeNT TPC



- Designed setups for testing SiPMs (Silicon PhotoMultipliers) for both round and square PCBs (Printed Circuit Board) using Autodesk Inventor software, with the guidance of Dr. Andre Cortez.
- 3D printed the test setup parts for square PCB.
- Soldered multiple connectors onto the PCBs.
- Tested temperature sensor using Lakeshore Temperature Controller.
- Setup a database (InfluxDB), and a data visualization platform (Grafana).



Cryogenics and TPC studies of DS-20k TPC Mockup at LNGS, Italy



- **DS-20k Mockup** is a setup used to perform several tests to confirm the functionality of DS-20k TPC.
- Operates an octagonal acrylic TPC immersed in approx. 1 ton of LAr, read by 2 arrays of 9 PhotoDetector Units (PDUs) reach on top and bottom.
- **Currently working on assembling the Mockup setup**, including the TPC, grid, temperature sensors, camera setup, etc. at LNGS for the past 2 weeks.



Upcoming plans; 2025

- DS-20k Mockup:
 - Monitoring the Mockup system in the underground lab during the cool down process.
- Testing SiPMs:
 - Fabricating 3D parts for circular PCB, and testing both circular and square PCB SiPMs and the plastic scintillator.
- Testing PCB using an injected signal.
- Assembling and calibrating AstroCeNT TPC.

Conferences/Meetings/Presentations; 2024

- [The 6th Young Astronomers Meeting](#), Warsaw, Poland, 6-8 March 2024:
 - Participation, volunteering, oral presentation.
- [VIenna Workshop on Simulations 2024 \(VIEWS24\)](#), Vienna, Austria, 22-27 April 2024:
 - Participation, oral presentation.
- [DarkSide-20k Summer Collaboration meeting 2024](#), Assergi, Italy, 12-16 June 2024:
 - Participation, oral presentation.
- [DarkSide-20k Winter Collaboration meeting 2024](#), Assergi, Italy, 19-22 November 2024:
 - Participation.

THANK YOU