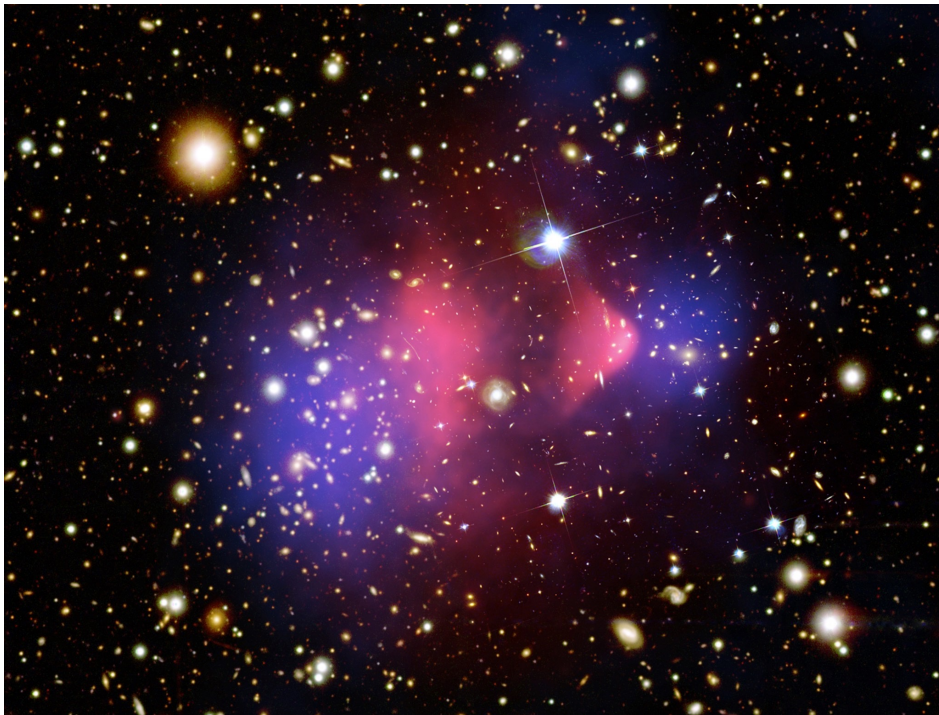


LIP Dark Matter Group

Highlights 2025/2026



Isabel Lopes



LIP Dark Matter Group

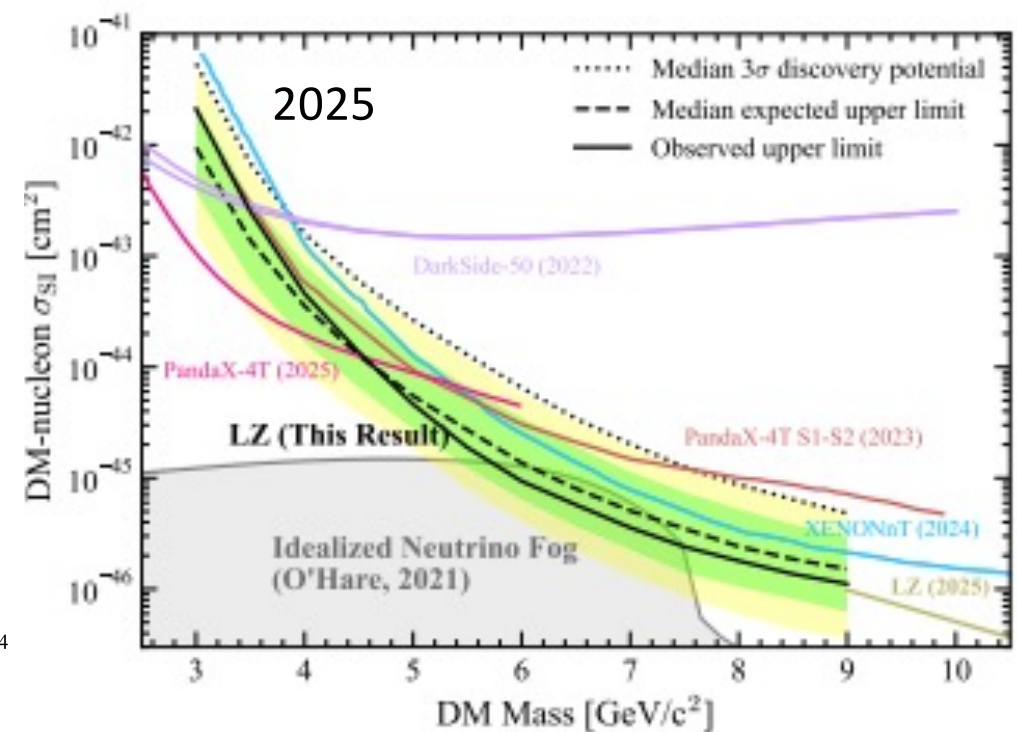
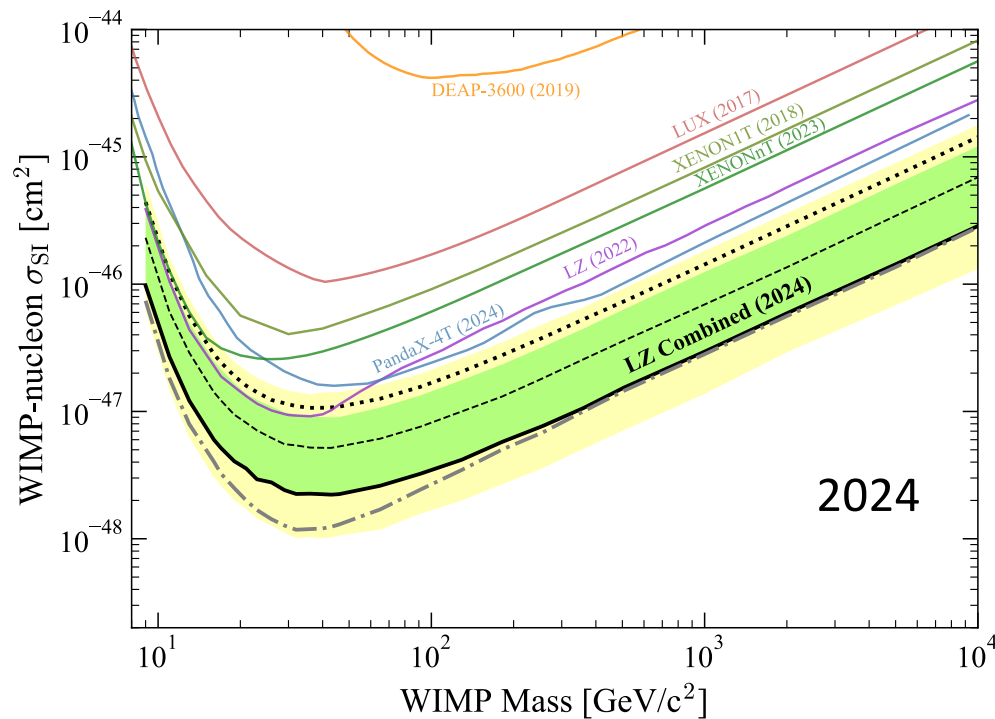
2025/2026

- Isabel Lopes (PI)
 - Alexandre Lindote (Assistant Professor at UC)
 - Cláudio Silva (Assistant Professor at UBI) ← **Returned to LIP**
 - Francisco Neves (Researcher)
 - Paulo Brás (Researcher)
 - Vladimir Solovov (Researcher)
 - Guilherme Pereira (PostDoc) → **Left LIP**
-
- Kai Jenkins (PhD student)
 - Sandro Saltão (PhD student)
 - Rui Ferreira (MSc student) → **Left (completed thesis)**

LIP Dark Matter Group @LUX-ZEPLIN



In 2025, **LZ released new world leading results** focused on the low-mass region (3-9 GeV) with a 5.7 tonne-year exposure (data collected between March 2023 and April 2025)



Main contributions of the group to the WIMP search result



- Paulo Brás became **Deputy Physics Coordinator** for the LZ Collaboration in Feb 2025, being instrumental in coordinating the data analysis.
- Full responsibility for **position reconstruction** of events, and **continuous calibration of the PMTs** using a novel method developed in-house.
- Spatial and temporal **signal corrections** and **energy reconstruction**
- Full responsibility for the online Underground Performance Monitor

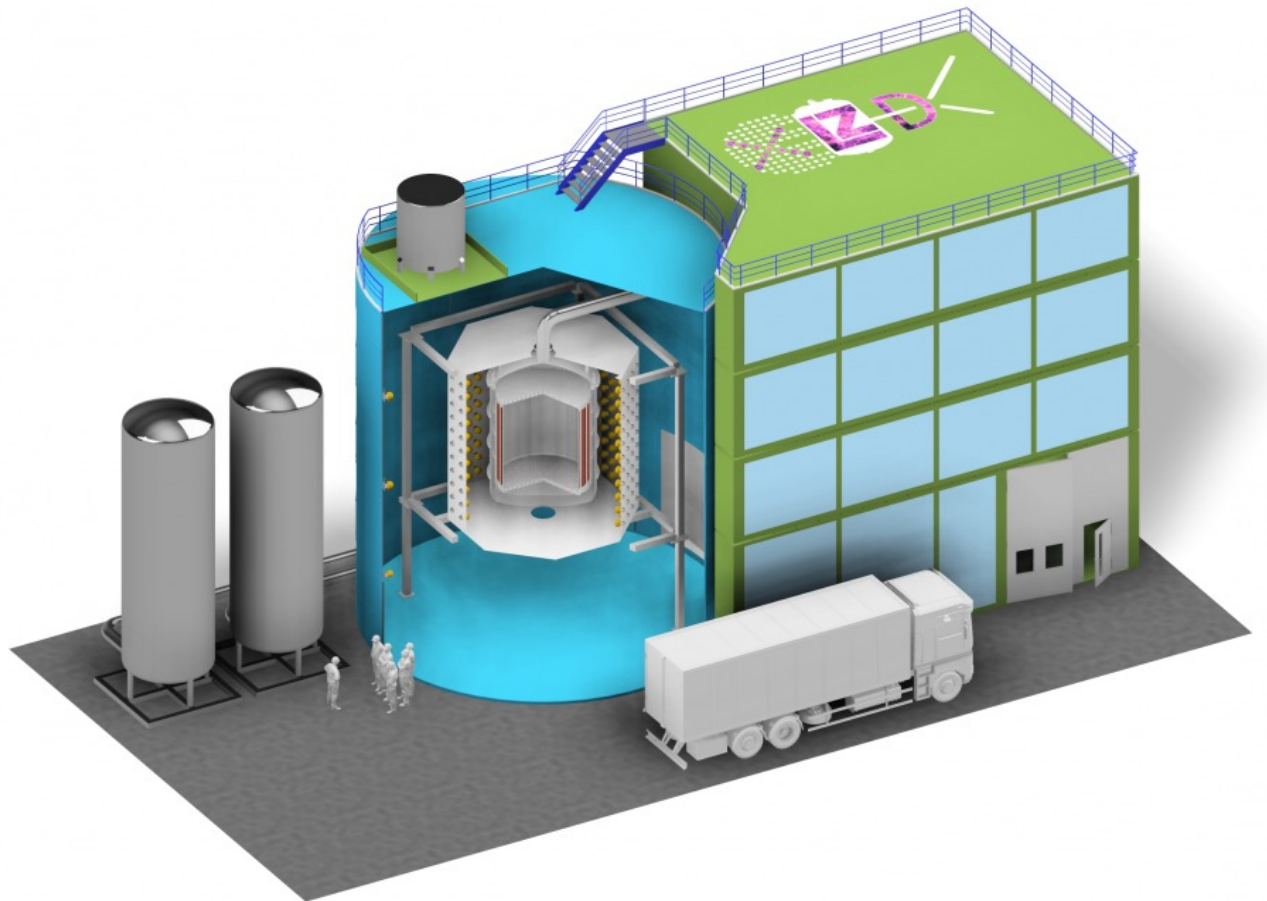
XLZD



2022: LUX-ZEPLIN + XENON + DARWIN → XLZD consortium

Goal: to operate a 60 – 80 t two phase Xe TPC to:

- **detect WIMPs**
- **search for Xe-136 $0\nu 2\beta$ decay**
- study/search other rare events (e.g. exotic dark matter, solar neutrinos, supernovas)



XLZD



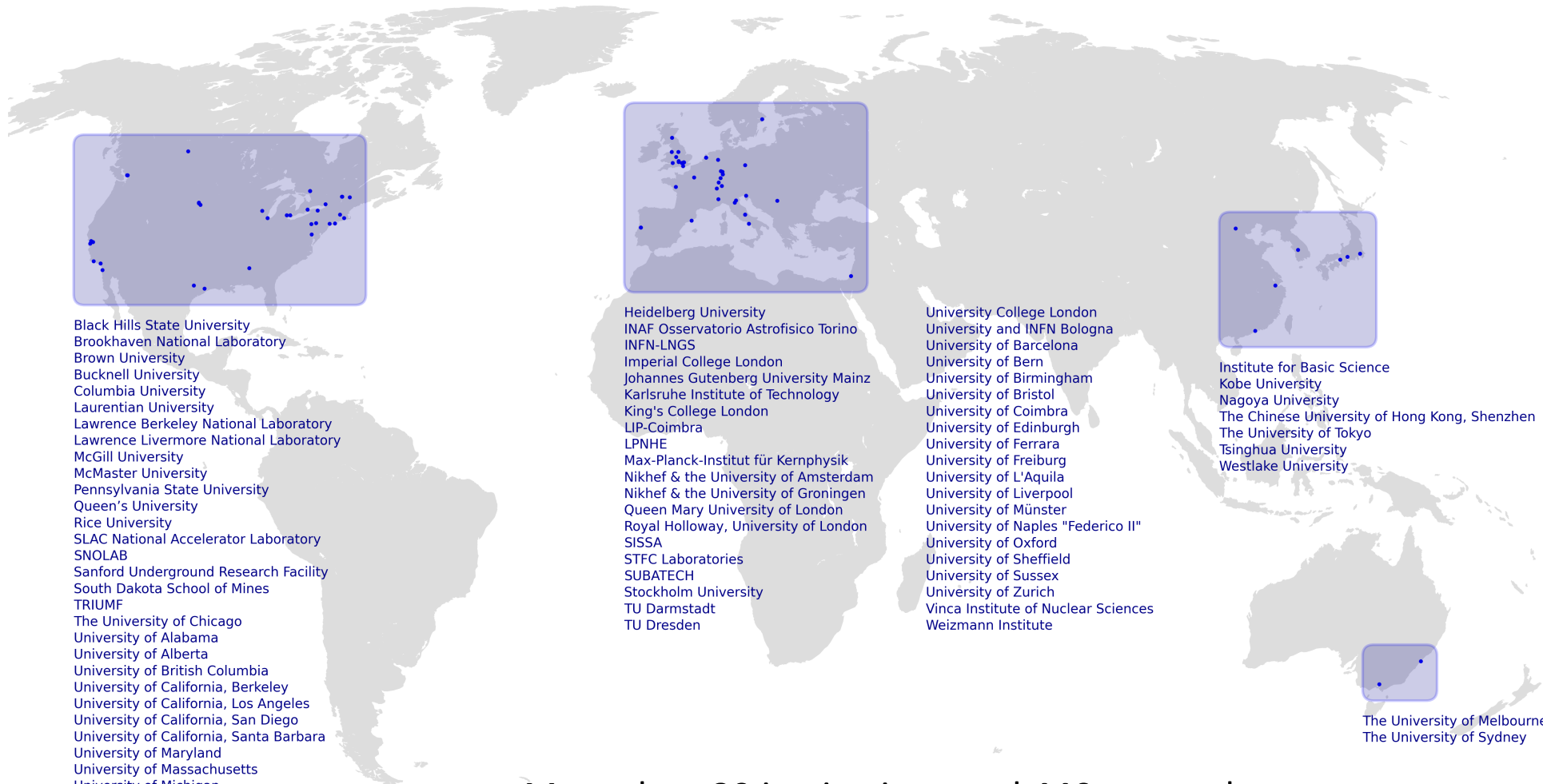
2025 Highlights:

- Publication of the XLZD Design Book ([10.1140/epjc/s10052-025-14810-w](https://doi.org/10.1140/epjc/s10052-025-14810-w))
- Publication of the XLZD Xe-136 $0\nu 2\beta$ decay sensitivity paper:
work and paper writing led by us ([10.1088/1361-6471/adb900](https://doi.org/10.1088/1361-6471/adb900))
- **Conceptual Design Report (CDR)** (to be completed in 2026)
- XLZD Consortium → **XLZD Collaboration**

LIP participation and leadership

- Xe-136 $0\nu 2\beta$ decay sensitivity enhancement: background modelling and discrimination
- Control system design

XLZD



More than 80 institutions and 440 researchers

Site decision still open: Boulby (UK), SNOLAB (Canada), LNGS (Italy) or SURF (USA)

Coordination positions

LZ

- **Physics Coordinator** (2/2026 -): P. Brás
- Deputy Physics Coordinator (2/2025 -1/2026): P. Brás
- **Data analysis Coordinator** (9/2022 – 12/2024): P. Brás
- Chair of the Publication Board (12/2024 -): A.Lindote
- Calibration Operations Coordinator (2/2024 – 12/2025): F. Neves
- High Energy Electron Recoil Group Coordinator (11/2019 -): A.Lindote

XLZD

- Control System L2 Convener: F. Neves
- Speakers Boarder Chair: A. Lindote

SWOT analysis

Strengths	<ul style="list-style-type: none">• A team with strong expertise on direct detection of dark matter and in liquid xenon detectors and their physics• The group holds 4 key coordination positions in LZ & XLZD, including the LZ Physics Coordinator (P Brás)
Weaknesses	<ul style="list-style-type: none">• Very limited mid-level main-power (only 1 Postdoc and 2 PhD students).• Limitation in presenting results in conferences and participating in LZ and XLZD due to no external funds
Opportunities	<ul style="list-style-type: none">• Extend our expertise;• Open the possibility of participating in cutting-edge projects• Attract students.
Threats	<ul style="list-style-type: none">• No external funding since November 2024.• Application to PTDC 2023 not funded