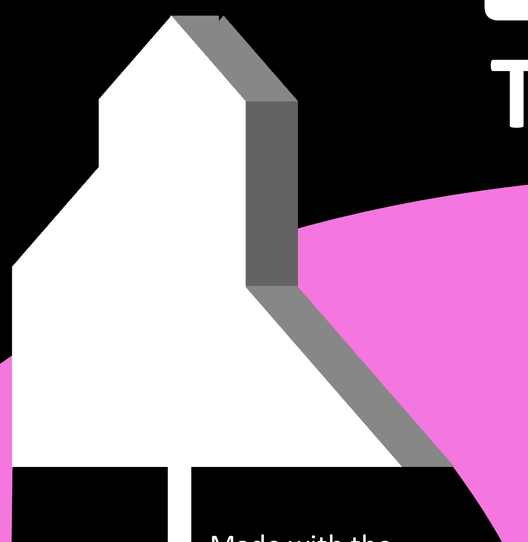
LUX-ZEPLIN

THE SEARCH FOR DARK MATTER

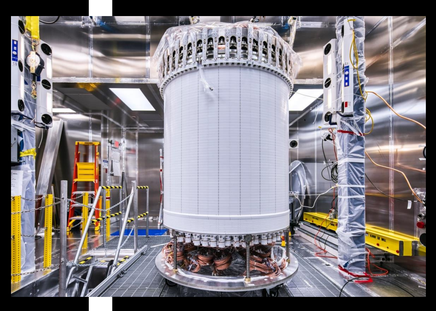
Poster by Nicolas Angelides,
for Prof. Bjorn Penning's group



Made with the most radiopure materials on Earth

BUGS Boulby, UK

LZ began assembly at the Sanford Underground Research Facility (SURF)



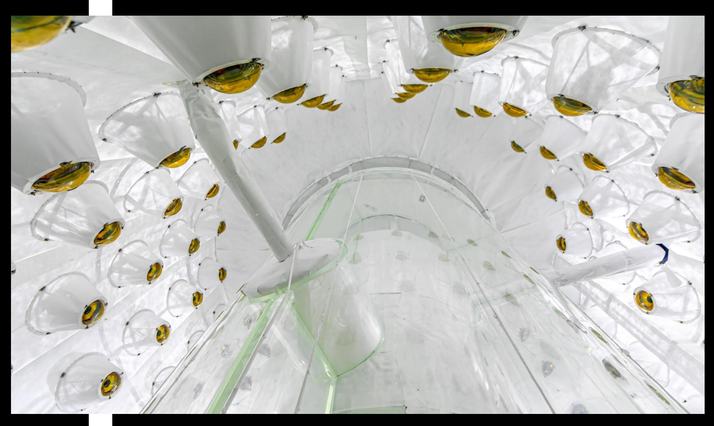
TPC in surface assembly cleanroom at SURF

The top PMT array during TPC assembly

The bottom PMT array and reflective field-cage

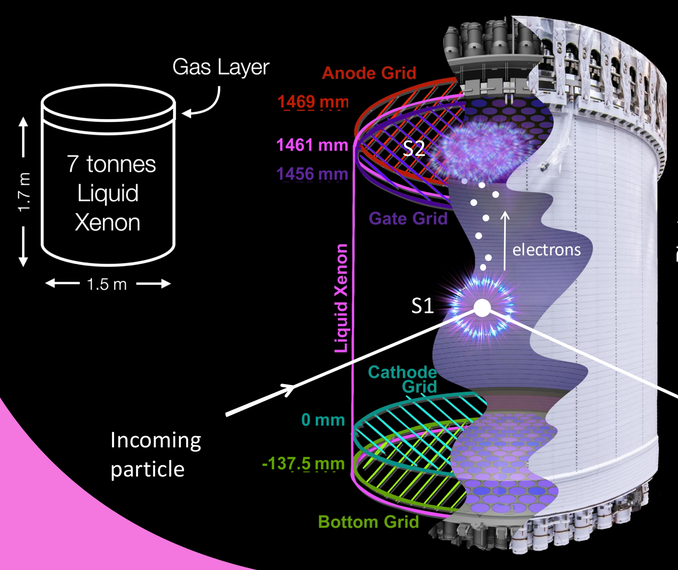
Transporting the TPC from the cleanroom to the shaft

The TPC suspended above the Yates shaft on its way down

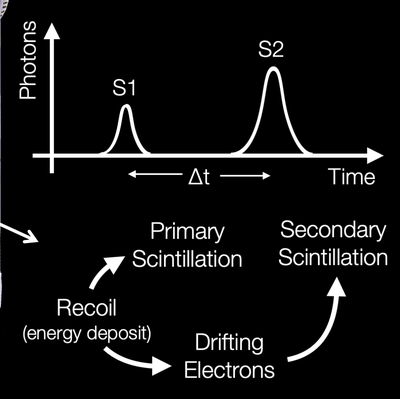


View of the acrylic tanks and outer detector PMTs

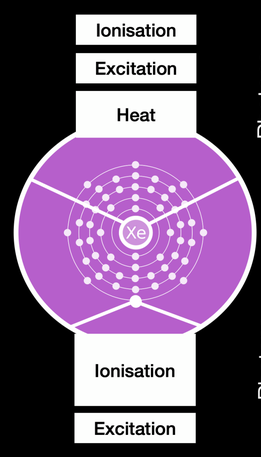
The TPC is surrounded by an active muon veto composed of acrylic scintillator tanks placed in water tank shield

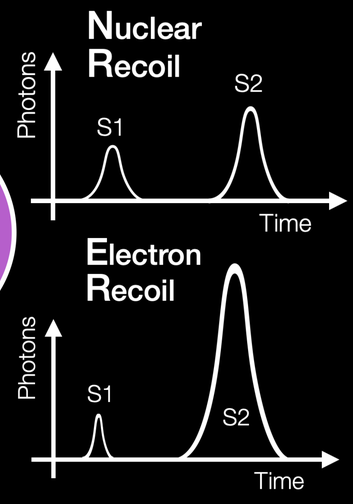


Time Projection Chamber



Two arrays with 494 PMTs collect light produced in the liquid xenon target within the reflective PTFE plastic barrel

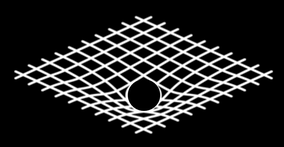




The combination of primary (S1) and secondary (S2) scintillation is used to reconstruct the type and location of every energy deposit

DARK MATTER

Neutral & Massive

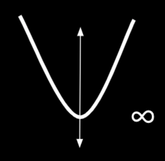


Interacts through gravity but not light (electromagnetism)

Evidence seen across scales; from small galaxies to clusters

Evidence implies dark matter is 85% of all matter density

Stable over the lifetime of the universe

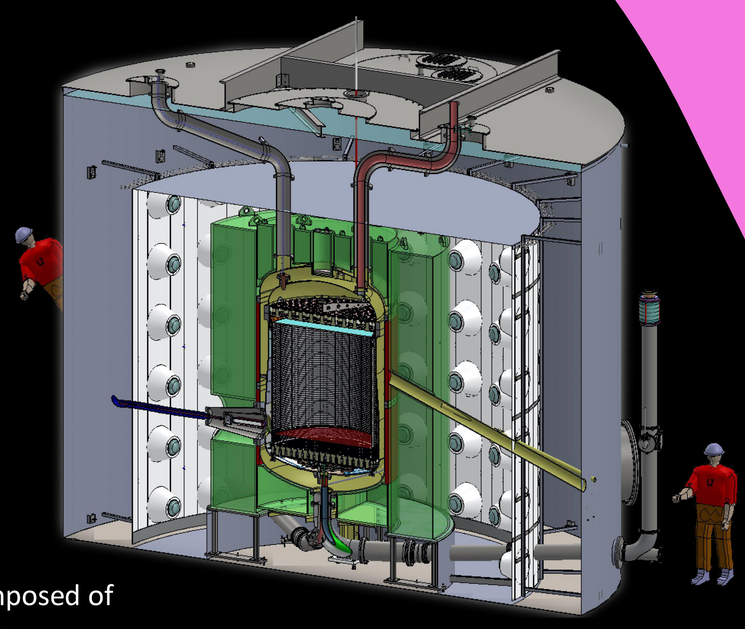


"Cold" - moves slowly enough to allow galaxy formation

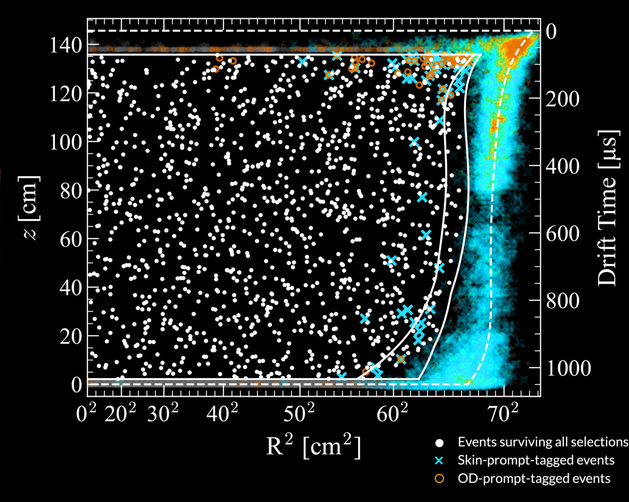
Cosmic and atmospheric radiation is blocked by the Earth but dark matter streams through it to reach LZ

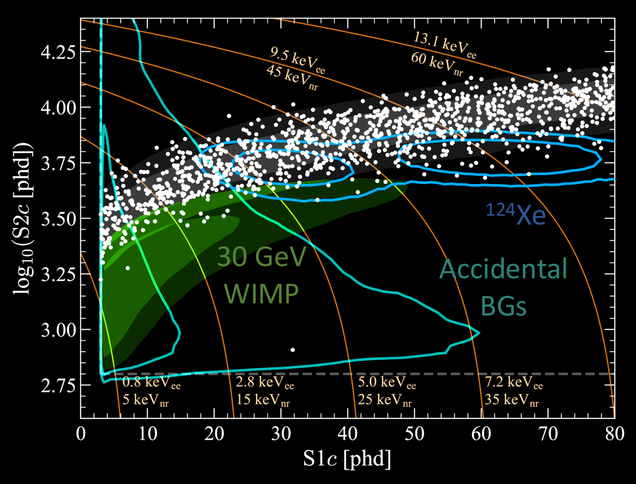
LZ is the most sensitive experiment ever constructed to search for dark matter

The detector is now 4850 ft underground in the Davis cavern at SURF, taking science data since 2021

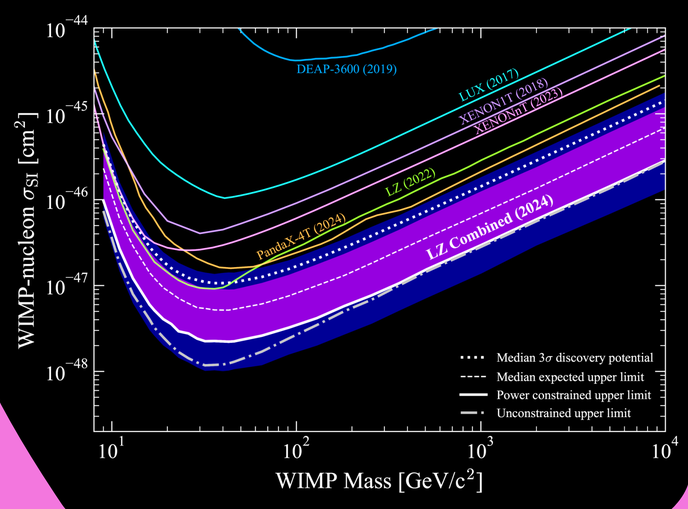


WIMP SEARCH 2024





Absence of signal provide important model constraints



LZ

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ibs Institute for Basic Science

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