DARWIN
(DARk matter WImp search with liquid xenoN)

With 40 tons of active target, DARWIN will be the ultimate dark matter detector, able to explore the entire experimentally accessible parameter space for WIMPs, until neutrinos become an irreducible background.

- Large detector.
- Low energy threshold.
- Ultra low background level.

powerful tool to probe neutrino physics

- Cylindrical dual-phase TPC.
- 2.6 m diameter and 2.6 m height.
- 50 t total (40 t active) of LXe.
- Two arrays of photosensors.
- Low-background cryostat.
- Outer and inner shields.
- ER discrimination level of 99.98%.
Solar neutrinos

Detection through elastic scattering:
\[ \nu_x + e \rightarrow \nu_x + e \]

More than 2500 pp-neutrinos per year. Flux measurement with 2% statistical precision.

- Test energy production mechanisms in the Sun.
- Test different neutrinos properties, such as \( P_{ee} \) and \( \sin^2 \theta_w \).

Neutrinoless double-beta decay

\( ^{136} \text{Xe} \) is a good candidate to study if neutrinos are Majorana fermions via the search of the 0\( \nu \beta \beta \)-decay.

- 8.9% of natural abundance (3.5 t).
- Q-value at 2.458 MeV.
- Energy resolution ~2%.

DARWIN’s sensitivity comparable to future dedicated experiments.

CNNS

The coherent neutrino-nucleus scattering will be detected for different neutrino sources.

\[ \nu + A \rightarrow \nu + A \]

- ~90 events/(t \times y) from solar \(^8 \text{B} \) neutrinos.
- Atmospheric neutrinos will produce \( \sim 3 \times 10^{-3} \) events/(t \times y).
- All flavors of supernova neutrinos will be observed as well. \( \sim 700 \) neutrinos for a SN of 27 M\( \odot \).