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Neutrino physics with the DARWIN observatory

Friday, June 21, 2024 5:30 PM (2 hours)

The DARWIN project aims to build and operate a next-generation observatory for dark matter and neutrino physics. The detector will feature a dual-phase time projection chamber with an active target of 40 tonnes of liquid xenon (LXe), built underground with carefully selected materials. Its low-energy threshold and ultra-low background will enable the search for a wide range of neutrino interactions and properties: via electronic recoils off the LXe target, the flux of the low-energy pp, ^{7}Be, ^{13}N, ^{15}O, and pep neutrinos can be measured; while a precise constraint of the ^{8}B solar neutrino flux will be achieved by measuring coherent elastic neutrino-nucleus scattering (CEvNS) interactions. Given its large target mass, DARWIN will be sensitive to neutrinos coming from a supernova (SN) burst, within and beyond the Milky Way up to $\sim$70 kpc. DARWIN will therefore participate in the SuperNova Early Warning System (SNEWS) both by listening for SN alerts as well as actively sending SN warnings to the network.
This contribution will cover the current DARWIN project design and neutrino physics reach of this next-generation LXe detector.

Poster prize

Yes

Given name

Diego

Surname

Ramírez García

First affiliation

University of Zurich

Second affiliation

Institutional email

diego.ramirez@physik.uzh.ch

Gender

Male

Collaboration (if any)

DARWIN

Primary author: Dr RAMÍREZ GARCÍA, Diego (University of Zurich)

Presenter: Dr RAMÍREZ GARCÍA, Diego (University of Zurich)

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