Chair of Galileo, from which, according to tradition, he gave lectures - Credits: Univ. of Padova - M. Pistore

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Potential of neutrino physics with DARWIN

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The DARWIN observatory is a future dark matter detector containing 40 tons of liquid xenon in an active volume of a dual-phase time projection chamber. An ultra low intrinsic radioactivity, large mass, low threshold and good energy resolution make DARWIN a suitable tool to perform a wide range of neutrino physics measurements. Natural xenon contains approximately 9% of ^{136}Xe that is considered one of the primary candidates to undergo neutrinoless double beta decay, and thus shine the light on the mystery of neutrino mass origin. In the inner 5t fiducial volume, DARWIN is expected to have a background rate of less than 0.2 events / (t · yr) in the region of interest for neutrinoless double beta decay of ^{136}Xe. This results in the projected half-life sensitivity of $2.4 \cdot 10^{27}$ yr after 10 years of operation. In addition, DARWIN will provide high precision measurements of solar neutrinos and can serve as a viable tool in an event of a galactic supernova. This contribution discusses key points that allow DARWIN to achieve such a sensitivity and its place among the next generation neutrino experiments.

Collaboration name

DARWIN

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