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P1.004 **Neutrino physics with DARWIN**

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on behalf of DARWIN collaboration

DARWIN (DARk matter WImp search with liquid xenoN) will be a multi-ton dark matter detector with the primary goal of exploring the entire experimentally accessible parameter space for weakly interacting massive particles (WIMPs) over a wide mass-range. With its 40 tonne active liquid xenon target, low-energy threshold and ultra-low background level, DARWIN can also search for other rare interactions. Here we present its sensitivity to low-energy solar neutrinos, to coherent neutrino-nucleus scattering and to neutrinoless double beta decay. In a low-energy window of 2-30 keV, where the sensitivity to solar pp and 7-Beneutrinos is highest, an integrated pp-neutrino rate of 10^5 events per year can be reached in a fiducial mass of 30 t of xenon. Such a measurement would allow for the comparison of the Sun's neutrino and photon luminosity with a precision of 1% and would open the possibility to test neutrino and solar models. Nuclear recoils from coherent scattering of solar neutrinos will limit the sensitivity to WIMP masses below 5 GeV/c^2, and the event rate from 8-B neutrinos would range from a few to a few tens of events per tonne and year, depending on the energy threshold of the detector. Deviations from the predicted but yet unmeasured neutrino flux would be an indication for physics beyond the Standard Model. DARWIN could also reach a competitive half-life sensitivity of 8.5×10^{27} y to the neutrinoless double beta decay of 136-Xe after an exposure of 140 t y of natural xenon.