DARWIN: a liquid xenon observatory for rare events physics searches

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Shedding light on the nature of dark matter and studying properties of neutrinos are among the main priorities of modern particle and astroparticle physics today. Worldwide, numerous direct detection experiments are prepared to observe rare signals induced by dark matter candidates and neutrinos in ultra-sensitive, low-background detectors. One of the leading technologies today are Liquid Xenon Dual Phase Time Projection Chambers. This technology is evolving rapidly and is expected to continue leading the field in the future years. In the context of this evolution, the DARWIN collaboration aims at the realisation of a future liquid xenon observatory. With about 40 tons of liquid xenon in its active volume, the detector will be designed to push the sensitivity of direct dark matter searches far beyond existing limits. Its low background and large target mass will also make it ideally suited for a large number of other rare event searches. In this talk I will present the concept of the DARWIN detector and discuss its physics reach, the main sources of backgrounds and the ongoing R&D efforts to overcome a multitude of challenges related to this ambitious project.

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