

**Tuesday, October 27, 11:30 am**

**Speaker:** Teresa Marrodan

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**Title:** Enlightening the dark: direct dark matter searches with XENON

**Abstract:** Cosmological and astronomical observations give a consistent evidence for the existence of dark matter. New particles, that could account for this non-luminous matter, appear in several theories beyond the standard model of particle physics. Although several hypothetical particle candidates have been proposed, so far dark matter has eluded detection. Direct detection experiments aim at probing the existence of WIMPs (Weakly Interacting Massive Particles) via their elastic scattering off target nuclei.

XENON1T is a dual-phase time projection chamber (TPC) with 2 tons of xenon in the target that has been operating from 2016 to 2018. Over the last years, XENON1T has set most constraining results worldwide on the cross section for the interaction of WIMPs with nuclei. Due to its large mass and unprecedentedly low background, the physics case of XENON1T has expanded to further rare-event searches. These include rare nuclear processes or neutrino interactions, among others. Recently, results from searches for new physics using low-energy electronic recoil data have been reported. The data enables competitive searches for solar axions, an enhanced neutrino magnetic moment using solar neutrinos, or for bosonic dark matter.

The experiment has been recently upgraded to XENONnT containing 6 tons of liquid xenon inside the TPC. While the commissioning of the new detector is currently on-going, the data taking is expected to start this year. This talk will cover direct detection emphasizing on the most important results of XENON1T. The status of XENONnT and the future plans with the DARWIN observatory will be also presented.