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Dark matter direct detection with the XENON experiment

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Astrophysical observations indicate that a significant fraction of the energy content of the Universe is composed of cold dark matter. The most promising candidates for a particle explanation of dark matter are weakly interacting massive particles (WIMPs). Xe based dual-phase TPC is one of the best technologies in the field of direct dark matter searches, reporting the most stringent upper limit on WIMP-nucleon spin-independent elastic scatter cross-section with the XENON1T experiment at Laboratori Nazionali del Gran Sasso (Italy). The upgraded project XENONnT, utilizing 5.9 t of instrumented liquid Xe, is currently taking data. With the exposure goal of $20 \text{ t}\times\text{y}$, the new experiment will reach a sensitivity to spin-independent WIMP-nucleon cross-section of $1.4 \times 10^{-48} \text{ cm}^2$ for a 50 GeV/c² mass WIMP (at 90% C.L.), one order of magnitude beyond XENON1T limit. The results reported by the XENON1T will be presented, as well as the status and the experimental program of XENONnT.

Primary authors: D'ANDREA, Valerio (Università dell'Aquila & LNGS); ON BEHALF OF THE XENON COLLABORATION

Presenter: D'ANDREA, Valerio (Università dell'Aquila & LNGS)

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