



XENON1T WATER CHERENKOV MUON VETO



- XENON is a dark matter direct detection experiment, consisting of a time-projection chamber (TPC) using xenon in double phase as sensitive detector medium.
- The XENON project is currently taking dark matter data at the Gran Sasso Underground Laboratory (Italy) with the XENON100 experiment (100 kg scale mass of target volume) devoted to explore the spin-independent elastic WIMP-nucleon scattering cross section at the sensitivity in the order of $\sim 10^{-45} \text{ cm}^2$.
- The next generation experiment **XENON1T**, with construction at LNGS starting this fall, aims at a further sensitivity improvement by two orders of magnitude to about **$2 \cdot 10^{-47} \text{ cm}^2$** . This requires a similar reduction in background and a fiducial mass of about 1 ton liquid xenon.

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- Backgrounds result from natural radioactivity in the detector materials and surroundings as well as from high-energy neutrons from cosmic ray muons penetrating the rock.
- Looking inside out, backgrounds are reduced by the self-shielding properties of high Z and high density liquid xenon, enabled by the 3D position reconstruction ability of the TPC, and by discrimination of electronic and nuclear recoils. Materials are screened and selected for radiopurity.
- Here we present the water Cherenkov muon veto system, which will attenuate all backgrounds from environmental natural radioactivity and tag energetic neutrons from muon interactions.

