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The XENONnT Dark Matter Experiment

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With XENON1T leading the search for dark matter, the XENON collaboration has started to plan an upgrade of the detector for the next phase, referred to as XENONnT. The XENONnT experiment will utilize the already built and functioning XENON1T infrastructures, such as the cryogenic system, Kr distillation system, and Xe storage and recovery system, with the time projection chamber (TPC) as the main upgrade. The upgraded XENONnT detector will be filled with 7.5 tons of ultra-pure liquid xenon, tripling the active liquid xenon target mass of XENON1T. About 500 low-radioactive three-inch R11410 PMTs will be used. Background from internal sources such as radon will be reduced. It will enable another order of magnitude improvement in dark matter search sensitivity compared to that of XENON1T, or accumulate statistics if a positive dark matter signal is observed by XENON1T. The detailed TPC upgrade plan, background control and reduction techniques, and predicted sensitivity reach will be presented.

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