

Abstract Submitted  
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**Purification for the XENONnT dark matter experiment**<sup>1</sup> ETHAN BROWN, Rensselaer Polytechnic Institute, XENON COLLABORATION — The XENON1T experiment uses 3.5 tons of liquid xenon in a cryogenic detector to search for dark matter. Its upgrade, XENONnT, will similarly house 7.5 tons of liquid xenon. Operation of these large detectors requires continual purification of the xenon in an external purifier, and the need for less than part per billion level oxygen in the xenon, coupled with the large quantity of xenon to be purified, places high demands on the rate of flow through this purification system. Building on the success of the XENON10 and XENON100 experiments, XENON1T circulates gaseous xenon through heated getters at a rate of up to 100 SLPM, pushing commercial pumps to their limits moving this large quantity of gas without interruption for several years. Two upgrades are considered for XENONnT. A custom high-capacity magnetic piston pump based on the one developed for the EXO200 experiment has been scaled up to support the high demands of this much larger experiment. Additionally, a liquid phase circulation and purification system that purifies the cryogenic liquid directly is being developed, which takes advantage of the much smaller volumetric flow demands of liquid relative to gas. The implementation of both upgrades will be presented.

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