

Abstract Submitted  
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**Measured Nuclear Recoil Discrimination for HPGS, a Proposed Ton-Scale Dark Matter Search in Room Temperature Gas** C. MARTIN, D. BARTON, M.P. DION, Temple University, J.H. ESTERLINE, C.R. HOWELL, Duke Univ./TUNL, C.J. MARTOFF, Temple University, P.F. SMITH, Rutherford Appleton Lab, W. TORNOW, Duke Univ./TUNL — The HPGS dark matter proposal is for a simple, room-temperature, ton-scale, 5-10 bar gas scintillation array with nuclear recoil discrimination by pulse-shape, aided by electric fields to suppress wall events. The first experimental confirmation of nuclear recoil discrimination by Xe gas scintillation pulse shape is reported here. Pulse shapes for  $\gamma$ - and x-rays, neutrons, and  $\alpha$  particles were measured using highly purified Xe gas at 1-6 bar with a UV-sensitive photomultiplier. Nuclear recoil and  $\alpha$  pulses were dominated by recombination scintillation with time constant 250 ns, while gamma and x-ray scintillation was completely contained within 15 ns. We will present detailed comparison of our nuclear recoil pulse shape discrimination to liquid Xe, and discuss the outlook for simpler and lower cost room temperature ton-scale dark matter detectors. (We heartily thank A. Bolotnikov for access to high-purity Xe in his lab at Brookhaven National Laboratory.)

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