

Abstract Submitted
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Commissioning and Operation of a Cryogenic Target at HI γ S¹

DAVID KENDELLEN, Duke University and TUNL, COMPTON@HI γ S COLLABORATION — We have developed a cryogenic target for use at the High Intensity γ -ray Source (HI γ S). The target system is able to liquefy helium-4 (LHe) at 4 K, hydrogen (LH₂) at 20 K, or deuterium (LD₂) at 23 K to fill a 0.3 L Kapton cell. Liquid temperatures and condenser pressures are recorded throughout each run in order to ensure that the target's areal density is known to $\sim 1\%$. A low-temperature valve enables cycling between full and empty modes in less than 15 minutes. The target is being utilized in a series of experiments which probe the electromagnetic polarizabilities of the nucleon by Compton scattering high-energy photons from the liquid and detecting them with the HI γ S NaI Detector Array (HINDA). During a 50-hour-long commissioning run last fall, the target held LHe at 3.17 K, followed by a 300-hour-long production run this spring with LD₂ at 23.9 K. The design of the target will be presented and its performance during these two runs will be discussed.

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