

Abstract Submitted  
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**Performance of the UConn-TUNL O-TPC with the Upgraded Optical Readout System\*** W.R. ZIMMERMAN, M. GAI, UConn, M.W. AHMED, S.S. HENSHAW, C.R. HOWELL, P.-N. SEO, S.C. STAVE, H.R. WELLER, TUNL, P.P. MARTEL, UMass — An Optical-Readout Time Projection Chamber (O-TPC) is being used at the High-Intensity  $\gamma$  Source (HI $\gamma$ S) at TUNL to study oxygen formation during stellar helium burning by measuring the time-reversed  $^{16}\text{O}(\gamma,\alpha)^{12}\text{C}$  reaction. The photodissociation of  $^{16}\text{O}$  generates ionization tracks in the 30cm x 30cm x 20.5 cm drift chamber. The electrons drift toward the multiplication region composed of three grids separated by 5 mm. The avalanche electrons induce scintillation light (primarily  $\lambda = 338$  nm) in  $\text{N}_2$  gas, and a CCD camera records an image of the two-dimensional projection of the tracks; hence the in-plane angle ( $\alpha$ ). Photomultiplier tubes measure the time-projection; hence the out-of-plane angle ( $\beta$ ). The azimuthal ( $\phi$ ) and scattering ( $\theta$ ) angles are reconstructed from  $\alpha$  and  $\beta$ . The total energy deposited in the detector is measured by the charge signal from the last grid, as well as from the photomultiplier tubes. Recent upgrades of the optical-readout system have improved the event identification. The larger design lens (142mm diameter) was installed leading to a factor of 15 increase in the light collection. The operation of the upgraded O-TPC system and measured in-beam events will be discussed. \*Work supported by the USDOE grant No. DE-FG02-94ER40870 and DE-FG02-97ER41033.

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