

Abstract Submitted
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Monitoring oxygen levels in the OMEGA nTOF scintillators using cosmic ray muons¹ MATTHEW SIGNOR, SEAN KING, STEPHEN PADALINO, State University of New York at Geneseo, CHAD FORREST, Laboratory for Laser Energetics — HEDP and ICF facilities measure neutron energies using a time of flight method, where the laser pulse is used as the start signal and a xylene scintillator is used as the stop signal. To improve timing performance, the scintillator liquid is oxygenated. This reduces the light production of the scintillator and subsequently decreases the scintillation decay time. The timing characteristics of the detector degrade over time as oxygen diffuses from the scintillator ultimately reducing the energy resolution of the detector. A real-time in-situ monitoring system using cosmic ray muons to determine oxygen concentration is being developed at SUNY Geneseo. The method uses a vertical stack of two EJ200 plastic scintillators with an oxygenated xylene detector placed between them. As cosmic ray muons pass through the stack of three collinear detectors, a triple coincidence is formed in the electronics. The coincidence confirms that the pulse was created by a muon. The xylene muon signals are recorded, fit with a modified Gaussian and the fit parameters are analyzed. This analysis is a good indicator of the oxygen concentration. The process is continuous allowing for a record of the oxygen concentration as a function of time and helps to determine when to re-oxygenate the xylene detector.

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