Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **73** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

Response of the 20"Super-K PMT in Magnetic fields of up to 250mG

Tuesday 10 June 2025 11:45 (15 minutes)

Super-Kamiokande (SK) is 50kT water Cherenkov neutrino detector composed of approximately 11,000 20" Photomultiplier Tubes (PMTs). Magnetic fields affect photoelectron trajectories through the bulb of large-sized PMTs and consequently can result in changes in the PMT gain and detection efficiency. For SK, it is becoming increasingly important to understand both the impact of residual magnetic field effects on PMT performance as well as the PMT angular response. The Photosensor Test Facility (PTF) at TRIUMF is a testbed designed to characterize the response of PMTs in various magnetic field configurations and light incident at different angles. Here we present new results investigating the gain, detection efficiency, and timing response of the 20"SK PMT in magnetic fields of up to 250mG. We also present simulation studies carried out in GEANT4 and COMSOL to investigate the optical effects on photon-absorption and the magnetic field effects on photoelectron trajectories in the PMT bulb and dynode in differing magnetic fields.

Keyword-1

Photomultiplier tube

Keyword-2

neutrino

Keyword-3

cherenkov

Authors: KONAKA, Akira; SMITHERS, Benjamin Randolph (TRIUMF (CA)); LI, Xiaoyue (TRIUMF)

Presenter: SMITHERS, Benjamin Randolph (TRIUMF (CA))

Session Classification: (PPD) T1-9 Neutrino experiments | Expériences de neutrinos (PPD)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)