



Contribution ID: 121

Type: Poster

The multi-PMT Optical Module for KM3NeT

Friday, 25 May 2012 13:31 (0 minutes)

KM3NeT, the future deep-sea neutrino telescope of multi-cubic km size, is being designed to search for high energy neutrinos originating from galactic and extragalactic sources. The neutrinos can be detected by collecting Cherenkov light emitted from relativistic charged secondary particles caused by the interaction of neutrinos with the medium surrounding the detector. To collect the Cherenkov light, a digital optical module (DOM) containing an array of 31 3-inch diameter photomultiplier tubes (PMTs) has been designed as a promising alternative to a DOM containing one 10-inch diameter PMT. The main advantage is to reduce the environmental background by requiring local coincidences between neighboring photo sensors and to provide a homogeneous photon acceptance. Optimum performance requires high collection efficiency at low dark noise, homogeneous photo-cathode response and excellent timing properties. We studied the response to single photo-electrons of newly developed 3-inch diameter PMTs from Electron Tube Enterprises Ltd. by illuminating various positions on the photo-cathode surface with picosecond-laser pulses. Results of these investigations indicate good photo-cathode homogeneity, low dark noise on the sub-kHz level, and an average transit-time spread below 2 ns. The mechanical setup of the multi-PMT DOM and the electronic configuration will be presented. The expected performance and the advantages of the multi-PMT DOM in the future KM3NeT detector will be discussed.

for the collaboration

on behalf of the KM3NeT Consortium

Primary author: Prof. LOEHNER, Herbert (KVI, University of Groningen)

Co-authors: Mr GAJANANA, Deepak (Nikhef Amsterdam); Dr DE WOLF, Els (Nikhef Amsterdam); Mr PEEK, Henk (Nikhef Amsterdam); Dr STEIJGER, Jos (Nikhef Amsterdam); Dr KAVATSYUK, Oksana (KVI, University of Groningen); Prof. KOOIJMAN, Paul (Nikhef Amsterdam); Mr TIMMER, Paul (Nikhef Amsterdam); Mr DOROSTI-HASANKIADEH, Qader (KVI, University of Groningen)

Presenter: Prof. LOEHNER, Herbert (KVI, University of Groningen)

Session Classification: Experimental Systems without Accelerators - Poster Session

Track Classification: P7 - Experimental Systems without Accelerators