



Contribution ID: 38

Type: **not specified**

Fiber based hydrophones for ultra-high energy neutrino detection

Monday, 9 June 2014 12:20 (20 minutes)

To survey large volumes of water for acoustic signals from neutrino interactions, optical fiber-based hydrophones could potentially have several advantages over conventional hydrophones based on piezo ceramics. Optical fibers form a natural way to create a distributed sensing system in which several sensors are attached to a single fiber. The detection system in this case will consist of several sensors, an erbium doped fiber laser and an interferometric interrogator. Further advantages of this technology are low power consumption and the absence of electromagnetic interference with other read-out electronics. Maybe even more important, fiber optics technology provides a cost-effective and straightforward way for the installation of a large number of hydrophones. This allows to establish a large scale experimental set-up with tens or hundreds of km³ detection volume that is required for the expected low event rate of neutrino interactions at energies exceeding 10 PeV.

In this talk we will discuss the fiber-based hydrophone technology, first measurements performed with test setups and the feasibility of a potential future large scale neutrino detector based on fiber-based hydrophones.

Summary

In this talk we will discuss the fiber-based hydrophone technology, first measurements performed with test setups and the feasibility of a potential future large scale neutrino detector based on fiber-based hydrophones.

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Session Classification: Mon AM II

Track Classification: Mon AM II - Acoustic