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Nuclear Instruments and Methods in Physics Research A 567 (2006) 538–544
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH Section A
www.elsevier.com/locate/nima

Towers and KM3NeT

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Available online 27 June 2006
on behalf of the NESTOR COLLABORATION

Abstract

NESTOR Collaboration has deployed one NESTOR module of the deep-sea neutrino telescope at a depth of 4000 m, 14 km off the southwest coast of Greece. The deployment site provides excellent environmental data. Power and data were transferred through a 30 km electro-optical cable to the shore laboratory. In this report, we describe briefly the detector and the well-defined procedure for recovery and deployment of a detector attached to the electro-optical cable and we depict the deployment of several towers and complementary independent strings acoustically connected to the towers.
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PACS: 95.55.Vj; 29.40.Ka; 13.15.+g

Keywords: NESTOR; Towers; KM3NeT; Deployment

1. Introduction

Neutrinos are promising candidates to be used in astronomy in addition to photons; matter or the electromagnetic fields of the universe do not affect them. Neutrinos are only involved in weak interactions and have an extremely small cross-section with nucleons ($\sim 10^{-38}$ cm^2 at 1 GeV energy). High-energy neutrinos interact with matter, producing relativistic muons that follow closely the direction of the parent neutrinos. Muons, traversing a transparent medium as water, produce Cherenkov radiation that could be detected by light-sensitive detectors as light pulses. By registering the arrival time and intensity of those pulses we can reconstruct the muon tracks and hence the neutrino tracks. Markov, in the early 1960s, proposed the use of sea water as the detector medium for neutrinos and several deep-sea neutrino telescopes prototypes are constructed. After the pioneering work by DUMAND [1] near Hawaii, detectors are currently operating at Lake Baikal (Siberia) [2] and in ice at the South Pole (AMANDA and IceCube) [3,4]. Moreover, a number of projects in the Mediterranean [5–7] were initialised in the

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doi:10.1016/j.nima.2006.05.183

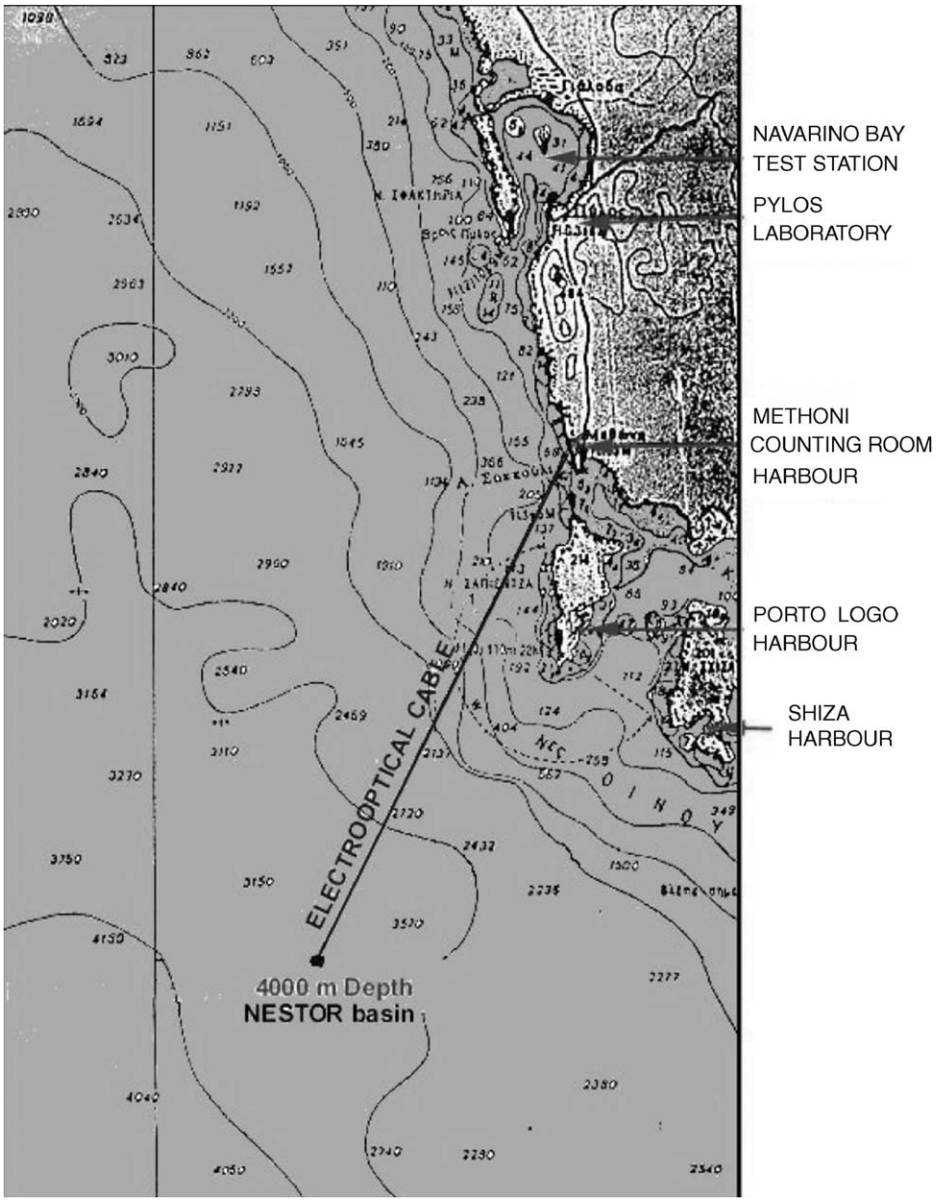

Fig. 1. NESTOR site chart showing the electro-optical cable route.

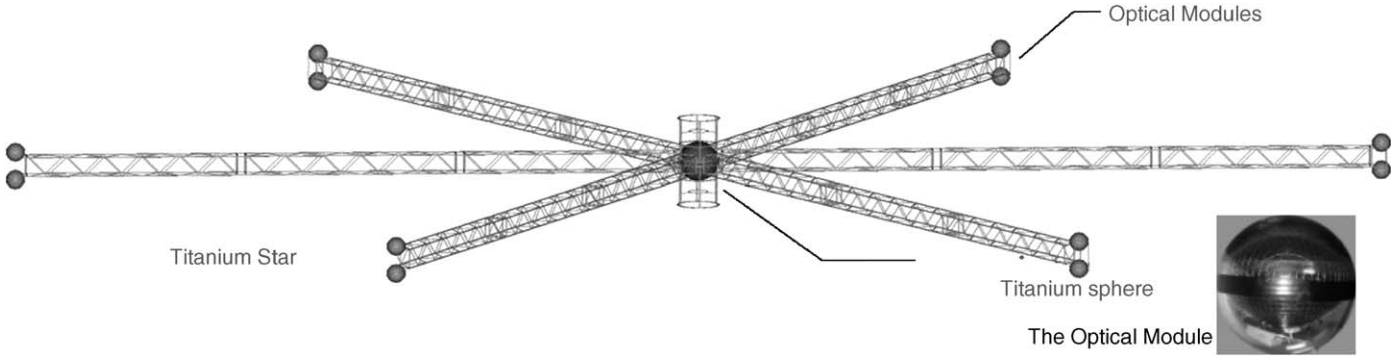

Fig. 2. The NESTOR module; the six-arm titanium star. Inset: The Optical Module.

last decade and lead to a European super-effort, to study the construction of a km^3 large neutrino telescope, the KM3NeT.

This paper presents some of the experience gained by the NESTOR collaboration in deploying such a detector, the on shore requirements, results from the basic element

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