



# 30th International Cosmic Ray C

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## Timing Calibration of the NEMO apparatus

This paper describes the timing calibration system for the NEMO (NEutrino Mediterranean Observatory) underwater neutrino telescope. Timing calibration is a critical task to perform in such a large apparatus, as the track reconstruction capabilities strongly depend on the accuracy of the time alignment of the measurements made by the different sensors. A system based on an optical fibre network which distributes calibration signals from fast optical pulsers to groups of photomultipliers has been designed and implemented on the prototype tower of NEMO Phase 1, which was deployed at a test site off the coast of Sicily, at 2000 m depth, in December 2006. This calibration system is controlled from an onshore console, which also delivers GPS-synchronized clock signals to the whole apparatus. Redundant timing information is collected by measuring the time delays for the synchronization signals to reach each offshore electronics module. We will illustrate the performance of the timing calibration system of the NEMO Phase 1 apparatus, as measured in the laboratory tests before deployment and in situ, and then discuss possible upgrades towards a km<sup>3</sup> apparatus.

collaboration :

NEMO

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