

The new CLBv4 for the KM3NeT neutrino telescope

The KM3NeT collaboration aims at the construction of a multi-km³ high-energy neutrino telescope in the Mediterranean Sea consisting of thousands of glass spheres, the so called Digital Optical Module (DOM), each of them containing 31 photomultipliers of small photocathode area for the detection of the Cherenkov light induced by charged particles produced by the interaction of neutrinos with matter inside or in the vicinity of the KM3NeT detector. The signal acquired by each photomultiplier is sent to the Time to Digital Converter (TDC) which is part of a Central Logic Board (CLB) based on the Kintex 7 FPGA. The TDC resolution is 1 ns and the White Rabbit technology is used to guarantee time synchronization at the level of 1 ns between each DOM. The new CLB has been routing to reduce the noise and to improve the clocks stability. Relative time calibration between photomultipliers is crucial to achieve an optimal performance. Due to the high volume to be covered by KM3NeT, a cost reduction of the different systems is a priority. To this end, a very low price time calibration device, the so called Nanobeacon, has been designed and developed. Also additional peripheral devices are connected to the CLB, in order to keep track of both, the environmental conditions (temperature, humidity and pressure), the DOM orientation (yaw, pitch, roll) and its position

Primary author: CALVO, David (IFIC)

Presenter: CALVO, David (IFIC)