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Temperature Control for SiPM characterization setup

SiPM are devices widely used in great experiments on high energy physics to measure the energy related to a specific phenomenon and establish its characteristics. Now, an international collaboration led by Fermilab and CERN is working on DUNE project, which use high quantities of SiPM organized in structures; these structures operate as transduction paths for response of photon detection devices called ARAPUCA to investigate nature of neutrinos. SiPMs must be characterized and we must begin for their temperature dependence, because DUNE will operate to cryogenic temperature (90°F) and is necessary to know SiPM operation in these conditions. Therefore, in Universidad Antonio Nariño (UAN-Villavicencio), we are developing an SiPM characterization setup to acquire capabilities and experiences to strengthen UAN participation on DUNE developing with Fermilab and other Latin-American universities.

This SiPM characterization setup with temperature control is the first stage of a medium-term program which aim is obtain capabilities and human resources in Colombia focusing IDI+i developing to modern technologies of particle and radiation detectors. The medium-term program consists of a second stage for analog signal conditioning, and third stage for signal acquisition using a multichannel card, finally, the fourth stage is the software required to analyze data from photon detector system. These stages are planned to be thesis for electronics engineering students and will be the basis to become highly qualified engineers with researching capabilities.

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