Abstract Submitted
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The radiation tolerance of particular optical fibers at low temperatures JOSHUA ABRAMOVITCH, Southern Methodist University — This research project seeks to characterize a number of optical fibers in an irradiated, low-temperature environment, so that they may be used in the Large Hadron Collider's (LHC's) high luminosity upgrade at the European Organization for Nuclear Research (CERN). In the LHC experiments such as ATLAS and CMS, silicon pixel detectors are used to precisely measure the trajectories of charged particles. These detectors operate in a radioactive environment with ambient temperatures of -20 to -30 degrees Celsius, hence the requirement of radiation tolerance at low temperatures. A number of new fibers have been selected for their decreased bend sensitivity and improved bandwidth. Since, the LHC luminosity upgrade's requirements are very stringent, the vendor's specification data will be replaced with the results of this project. An optical test bench was needed to characterize the optical fibers in ionizing radiation from a Co-60 gamma source at Brookhaven National Laboratory in February 2011. Such a multi-channel optical measurement setup is not commercially available, and was as such designed in-house. Multiple 850nm VCSEL laser were used as sources, and TI OPT101 chips were used as detectors. This research contributes to the optical link R&D project with Fermi National Laboratory, Oxford University, and CERN, and my work's progress is integrated into the project flow of this international collaborative group.

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