10 August, 2018

Dear Colleagues,

We would like to describe briefly the tests we performed on irradiated samples of Sylex® optical fibers in advance of deploying them in the muon detector of the Compact Muon Detector at the CERN Large Hadron Collider.

The units tested were a 10m trunk 12-fiber cable (Sylex description: MTP(F)-MTP(F) 12-fiber OM3 trunk Polarity A, L=10.00M) and a 0.5m + 1.0 m fiber fanout (Sylex part description: 01x MTP(F) - 12x LC/PC 12F OM3 FANOUT 01.5M FL10). Both assemblies use Corning® ClearCurve® Multimode optical fibers.

Our largest radiation doses will be accumulated near the innermost chambers of our muon system, where the anticipated total integrated does is around 10 kRad. For the fibers, our main concern was the development of color centers under radiation, which would result in shortened attenuation length for the transmitted light.

The exposure took place at CERN High Energy Accelerator Mixed Field (CHARM) facility in September 2017. The conditions of the CHARM facility were chosen to reproduce a spectrum of particle energies that is typical of that encountered inside the CMS detector. The fibers were exposed to a total integrated dose of 22 kRad over a period of seven days.

The intensity of the transmitted light was measured before and after irradiation with a light intensity meter (Fluke SimpliFiber Pro optical power meter). The source of light was Finisar FTLF8524E2GNL Optical Transceivers. The sensitivity of the measurement was about 0.5 dB, and no degradation was observed as a result of the radiation exposure.

We concluded that these fibers meet our requirements for operation within the CMS muon system. We are happy to answer any questions about these tests.

Best regards,

 

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