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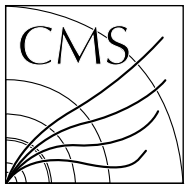
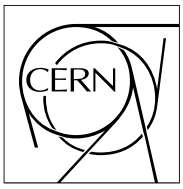
CMS DP -2024/128



The Compact Muon Solenoid Experiment

CMS Performance Note

Mailing address: CMS CERN, CH-1211 GENEVA 23, Switzerland



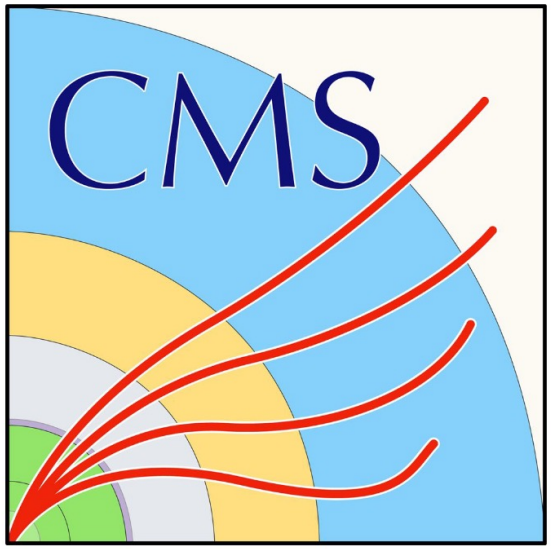
19 December 2024

ODTR test with optical fiber irradiated at CHARM

CMS Collaboration

Abstract

Results from the ODTR test with optical fiber irradiated at CHARM.



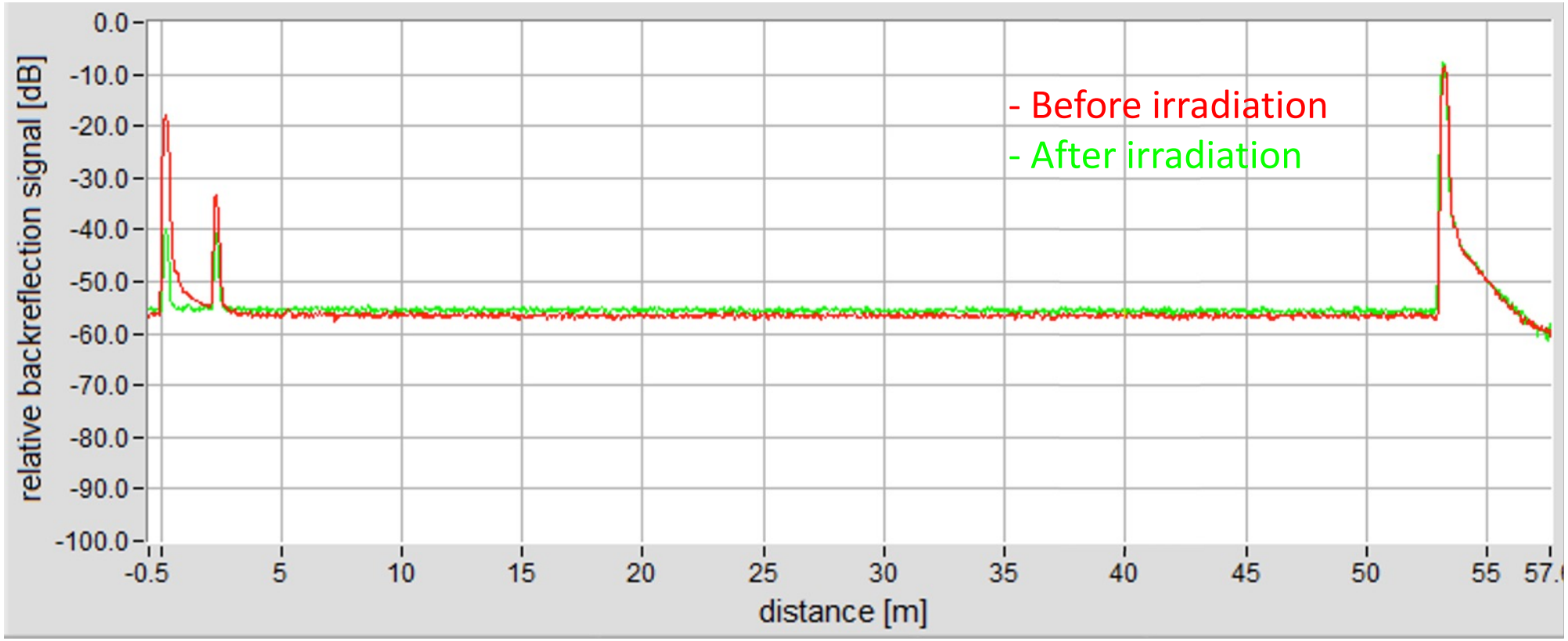
ODTR test with optical fiber irradiated at CHARM

Contact : cms-dpg-conveners-rpc@cern.ch

OTDR (optical time domain reflectometer) [1]

All OTDRs are based on the same principle: a short pulse of light is sent towards the Fibre Under Test (FUT) through an optical coupler, and back reflected light is analysed at a detector. It is specially designed for short-range analysis of optical networks.
It can be used to measure the distributed attenuation along the fibre, to check for example the homogeneity of the fibre. It can discover and identify damages, which may have occurred during the laying out of the fibre (bends, pressure points...). You can see losses and backreflections from connectors or optical components.

[1] ν-OTDR Users's manual - High resolution OTDR Sunrise Telecom Inc.; 2006. info@sunrisetelecom.ch
PDF link.



The data obtained with the OTDR (optical time domain reflectometer) show no significant attenuation effect on the optical fiber after the CHARM (CERN High Energy Accelerator Mixed Field Facility) irradiation period, corresponding to 147 Gy of received dose. Based on this result, these fibers meet the total integrated dose requirements equivalent to ten years of HL-LHC operation, 10-12 Gy, with a safety factor close to 15.