

The laser calibration system for the Muon g-2 experiment at Fermilab has been installed and tested. Six Picoquant lasers and splitting optical components have been installed in the laser hut outside the ring. The laser hut is connected to the 24 calorimeters inside the ring through 72 optical fibers (24 for the forward pulses, 48 for monitor purpose). Moreover, 24 diffusers are close to the calorimeters in order to perform the final fan-out to 54 optical fibers (one for each  $\text{PbF}_2$  crystal in each calorimeter). A light distribution Delrin panel carrying out 54 reflecting prisms have been placed in front of each calorimeter, in order to keep in position the crystals and deflect the laser pulses along the crystal axis, towards the SiPM detectors. Monitors have been installed in order to measure laser fluctuation (source monitor) and stability of the optical path (local monitor). The laser system is working properly, close to the TDR requirements.

Moreover, the laser system provides laser pulses to other detectors, like the T0 detectors (for synchronization purpose) and the two Fiber harp detectors (synchronization and calibration purpose). It was not possible to connect the IBMS detectors for technical reasons (overall dimensions of the diffuser and of the access channel).



The optical table in the laser hut

Published material:

The laser control of the muon g-2 experiment at Fermilab

Anastasi, A.; Anastasio, A.; Avino, S.; et al.

JOURNAL OF INSTRUMENTATION Volume: 13 Article Number: T02009 (2018)

The Fermilab Muon g-2 experiment: laser calibration system

Karuza, M.; Anastasi, A.; Basti, A.; et al.

JOURNAL OF INSTRUMENTATION Volume: 12 Article Number: C08019 (2017)

Geant4 simulations of the lead fluoride calorimeter

Savchenko, A. A.; Tishchenko, A. A.; Dabagov, S. B.; et al.

NUCLEAR INSTRUMENTS & METHODS B Volume: 402 Pages: 256-262 (2017)