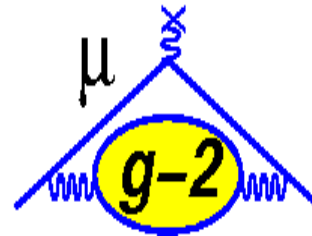


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WP3: Muon $g-2$ Calibration System Update

C. Ferrari, D. Cauz
MUSE Scientific Board Meeting
13th Sept 2019

G-2 laser calibration systema (WP3)

Little change compared to Cauz's presentation in July, **the cooling system in the laser hut still under construction**, the laser system is not in use

In June one laser head was damaged by excessive temperature (36 ° C)

- SM: PINs and PMT signals from SMs show a gain sag for times less than 100 μ s due to proximity of the In-Fill pulses with the Sync pulse.
Mitigation: Sync pulse has been advanced by 70 μ s
- LM2: readout electronics fix still not yet implemented
- Asynchronous trigger: not yet implemented
- Laser studies (STDP, LTDP): several presentation on the STDP by E. Bottalico
- Gain corrections (OoF, IF): update on IFGF soon released by A. Driutti
- JINST paper: still under review

G-2 hardware shutdown activity

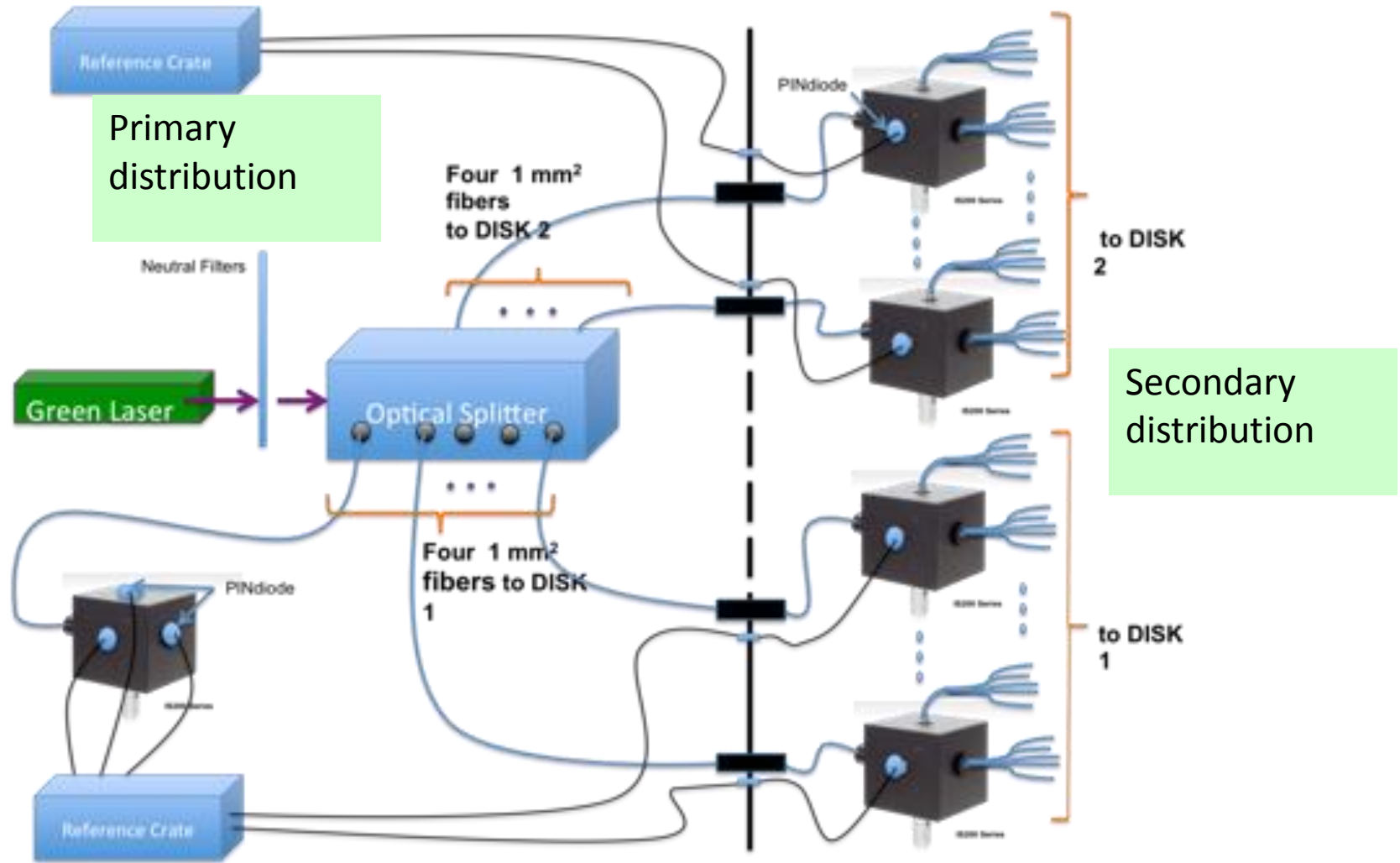
Replacement of the NIM crate electronics with the new CAEN logic (FPGA-based) remotely programmable



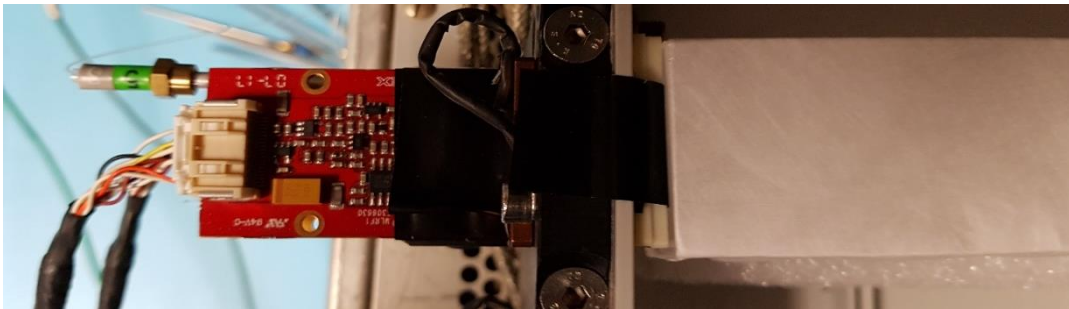
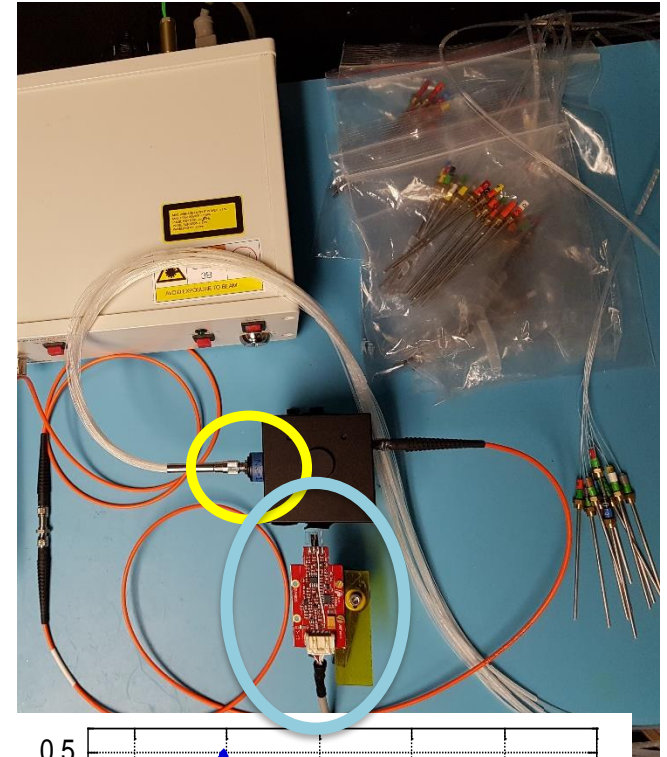
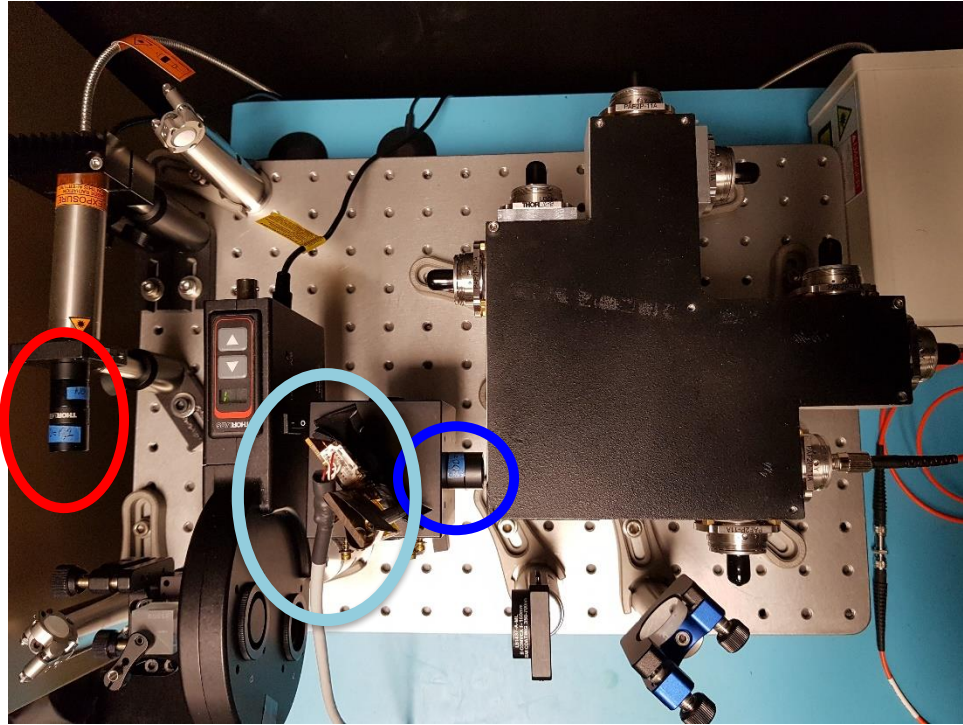
Mu2e laser calibration system

- Since the last presentation (29th April 2019) the secondary distribution systema has been tested (but the optical feedthrough, just arrived at FNAL).
- Both monitor systems (source and local) have been tested

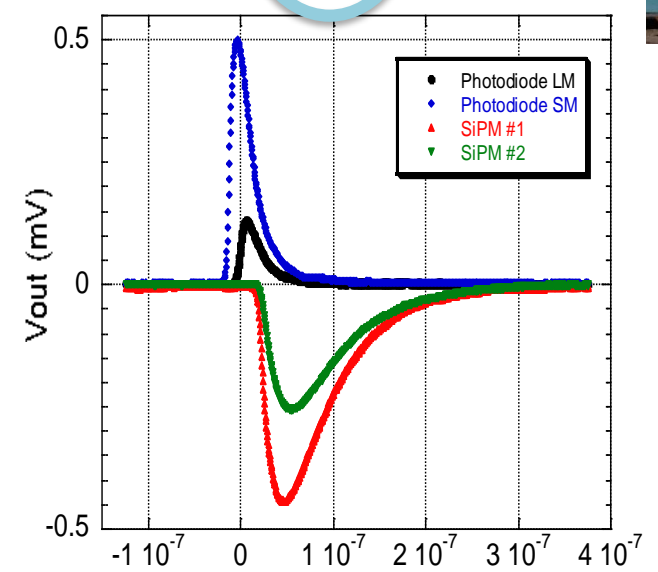
Mu2e Laser System Scheme



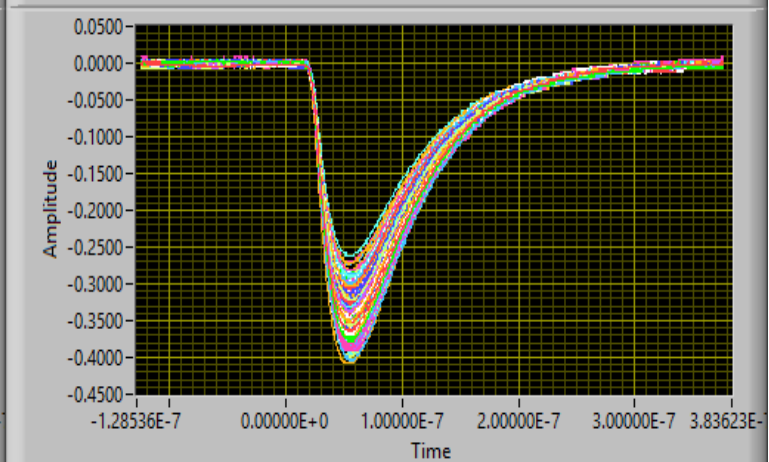
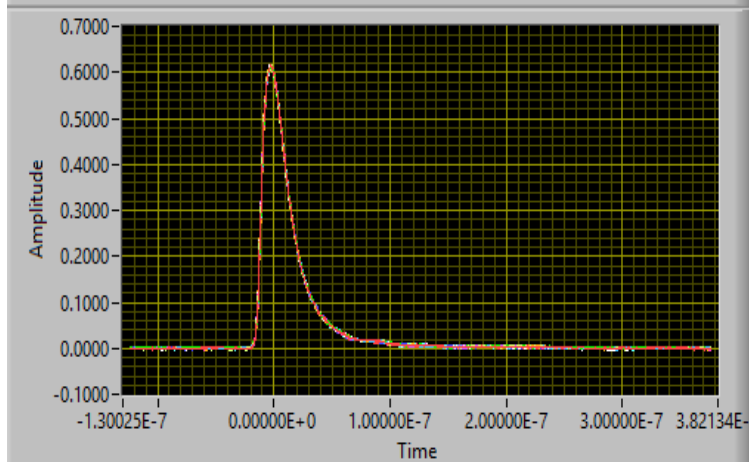
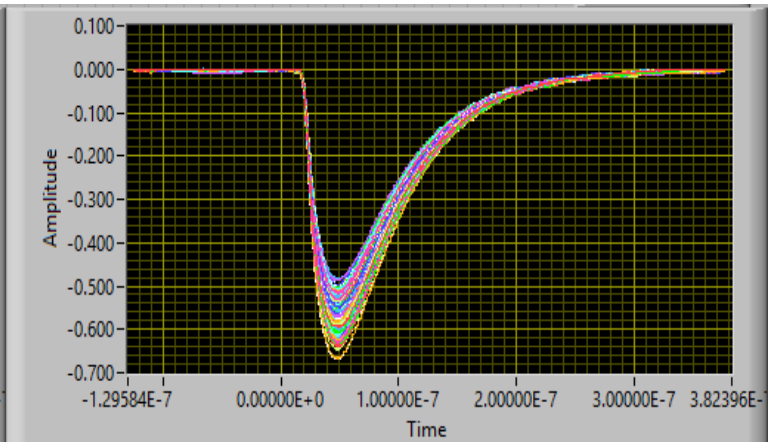
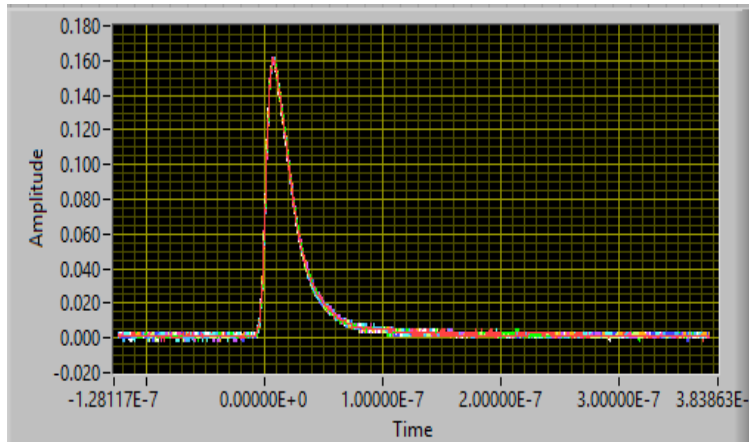
Mu2e Laser calibration system



Adequate laser intensity (by a factor 20)



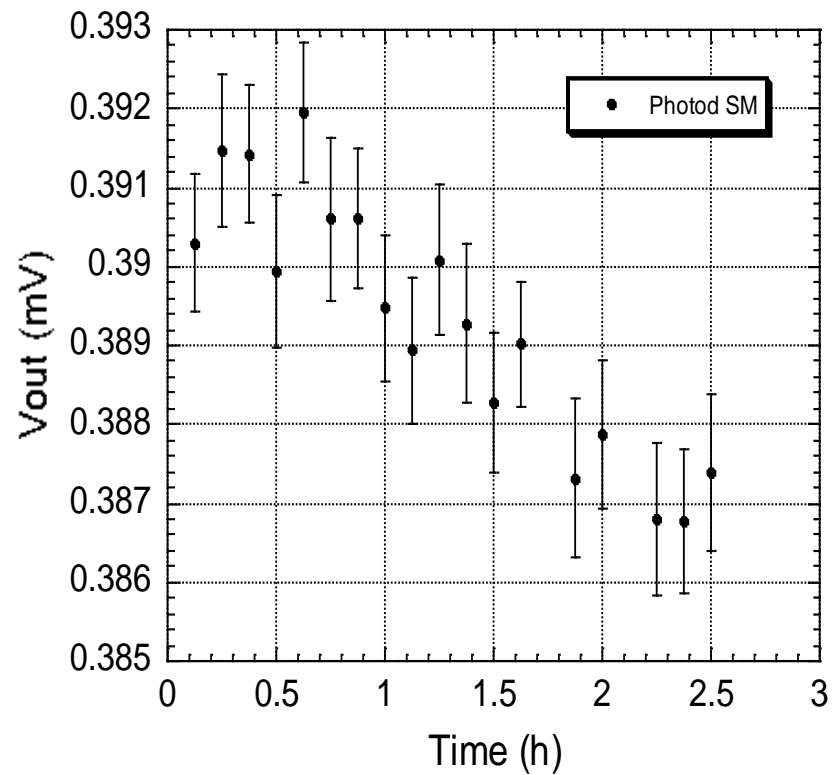
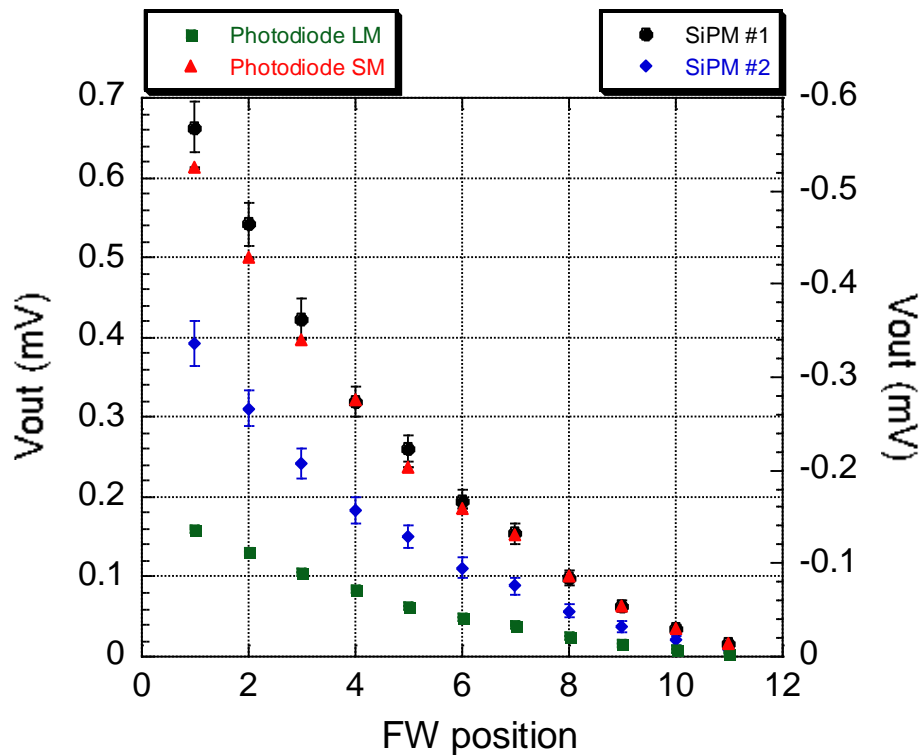
Persistency plot 600 waveforms



Monitor's photodiodes
(mod. s1226)

SiPMs

Filter wheel scan and laser stability

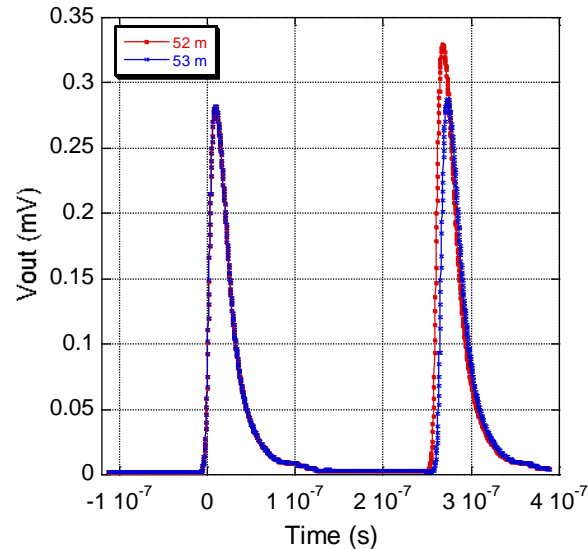
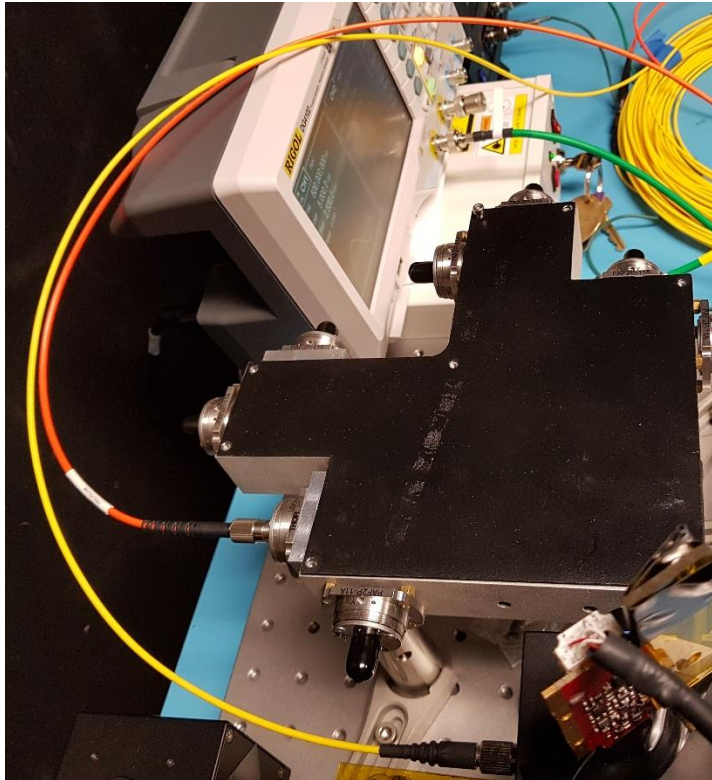


0.5 %/hour drift

Filter wheel transmission: 100% - 1%

Setup for fiber length measurements

Connect the fiber to the collimator and to the SM sphere



The time delay introduced by the 1 m long fiber is $\delta t = 5.25 \text{ ns}$.

As the refraction index of pure Silica is 1.461 (@ 532 nm), the expected value would be 4.87 ns

