







INO-CNR Istituto Nazionale di Ottica





### WP3: Muon g-2 Calibration System Update

C. Ferrari, D. Cauz MUSE Scientific Board Meeting Feb 24<sup>th</sup> 2017

# Outline

- Fiber bundles
- Secondary distribution boxes for calorimeters
- Laser hut
- Optical fibers
- Monitor systems

#### Installation status

18 trolleys in the ring1 calorimeter in the ring

The calorimeter has been connected to the optical fiber and data has been acquired using the DAQ





#### Secondary distribution boxes

The 25 boxes have been completed, 21 already embedded in calorimeters



#### **Optical fibers**

To protect optical fibers we use a plastic corrugated tube

Each tube contains 3 fibers: the silica launching fiber, a silica and a PMMA fiber for the local monitor.

#### We installed the 24 corrugated tubes. Transmission checked.





#### Laser hut

- The interlock system for laser safety is ready;
- > outlet holes for fibers and cables on the optical table cover and lasers heads cables are done;
- the optical components have been installed on the optical table and aligned;
- We are in contact with the ESH&Q Division for permission to use the lasers (class 3B). We hope to get permission by mid March. We have the permission to use the low power PDL 200-B driver for a single laser head (4 calorimeter)



#### The source monitor



#### The source monitor installation

Three source monitors have been installed in January, the remaining three will be in March One of them is already equiped with front-end electronics and interfaced with the WFD, data have been read with the DAQ system

Plan for the source monitor boards:

 test with Udine colleagues by January (DONE)
testing of firmware with Controller Board: communication and reading whole crate by February (DONE)

3) Installation at Fermilab: three boards in February + three boards in March

- > 10 SMB have been produced and available in Naples
- 2 Controller Boards have been produced and available
- 1 Crate (full opt: PowerSupply + Fan +...) will arrive in February 2017



#### The local monitor electronics

It consists of 2 x 24 PMT, and its associated electronics boards for signal conditioning and make it differential.

2 optical fibers reach each PMT, bandpass filters reduce the ambient light.









10

### The local monitor











#### Software

In February some software has been developed and some hardware installed in order to control the laser system from the Control Room.

In particular:

- ✓ The 6 filter wheels are controlled using a Beaglebone board;
- ✓ The lasers power supply (Picoquant Sepia II) is controlled using a PC
- $\checkmark\,$  The laser control board is controlled using a PC
- ✓ The CAEN SY127 Mainframe is controlled usign the Beaglebone board.

# Conclusions

- The laser calibration system installation is going on (almost in schedule).
- All the secondary distribution boxes (diffuser, bundle and Delrin panels) have been assembled (24+1 spare) and are ready to be integrated in the calorimeters (21 already embedded).
- The optical components and lasers have been installed in the laser hut.
- The optical fibers have been installed inside the ring.
- Optical components and fibers have been aligned
- Three monitoring systems (and electronics) are being assembled.
- Plan to complete the installation in March.
- The calibration procedure must still be refined.
- Tests foreseen during commissioning: flight simulator, pile-up studies, stability of monitors.