# WP3 calibration

Task 3.1

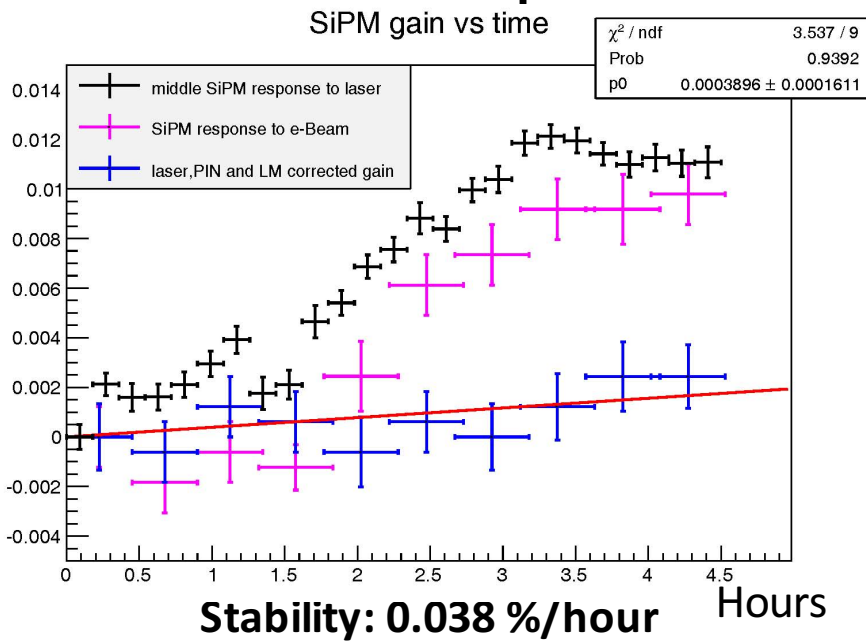
Development and assembly of the g-2 laser calibration system

# Laser calibration system - Components

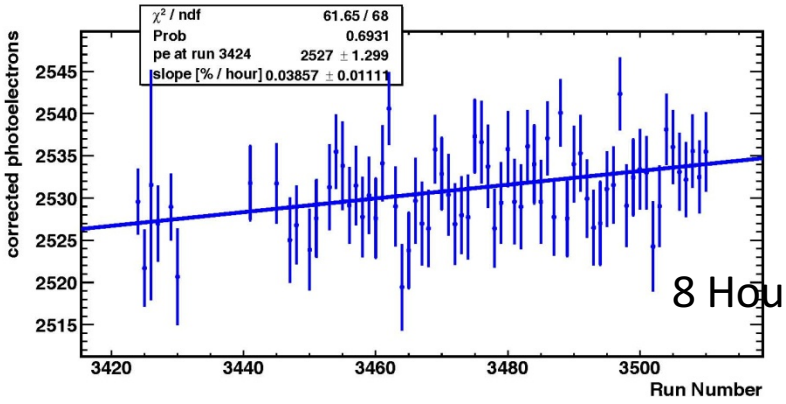
- Laser light source: 6 x PicoQuant LDH-P-C-405M:
  - 1 nJ pulse energy; 700 ps pulse width; 405 nm wavelength
- Beam splitting and calibration: 6 x
  - Optical components to split the beam in 4 parts (24 calos)
  - Filter wheels
- Light distribution system: 24 x
  - collimators
  - 400 μm diameter, 25 m-long fused silica fiber
  - Engineered diffusers
  - fiber bundle of 1 mm diameter 60 PMMA fibers
  - Light distribution panels with prism
- Monitoring detectors: 6 x
  - For source monitor (laser intensity):
    2 PIN diodes (Ham. S3590-18)
    1 PMT (Ham. H5783)
  - For local monitor (light distribution):
    2 PMTs (Photonics XP2982)
- Electronic:
  - For source and local monitor

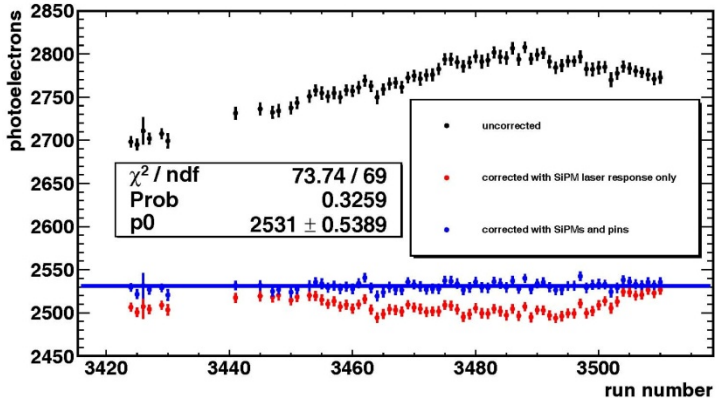
# Laser calibration system- Test of components

- LNF test beam
  - Test of the laser calibration system and the full light distribution chain using a 5-element calorimeter prototype, with a 450 MeV electron beam and preliminary in-house frontend electronics
- SLAC test beam
  - Test of a full calorimeter and calibration system, with a 3 GeV electron beam and the full in-house electronics, including both laser control and frontend data acquisition (Waveform digitizer for the SiPMs, in-house electronics for PMTs and PIN




**Stability: 0.038 %/hour**




The correction seems quite effective, including the source monitor (Step 1) definitely improves the result

# Laser calibration system
## Next steps

- Material procurement, construction and assembly:
  - Orders in progress:

    Done: Optical components, optical fibres, PMTs, diffusers, electronics (SM)

    In progress: Lasers, Fibers bundles, electronics (LM), Delrin panels for light distribution
  - Light distribution panels assembling (panels, prisms, bundles, boxes, diffusers): september 2016

- System integration in g-2 building (fibers, cables, calo):
  - Fibers laying: august 2016
  - Optical components in the laser hut: september 2016
  - Calorimeter assembling (light distribution panels to the Calos): october 2016
  - Electronics Source monitor: end 2016
  - Electronics Local monitor (+ PMT, boxes): early 2017