

EP-DT *Thin Film and Glass Service (TFG)*



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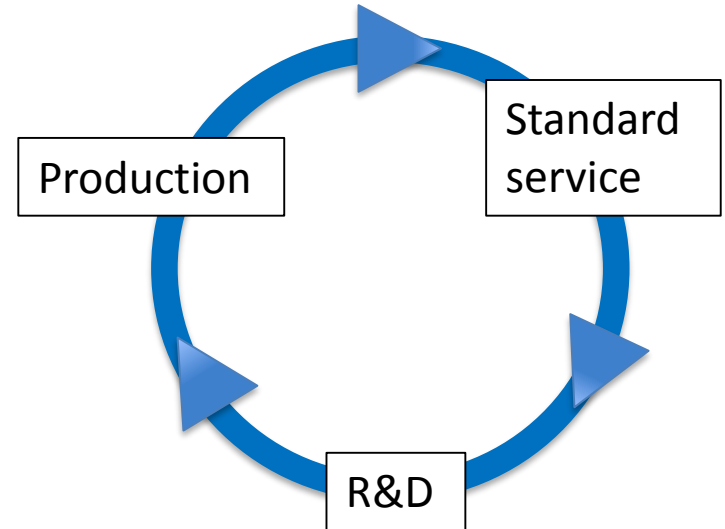
Baptiste Lucile

•*Thin film coating*

30 years growing experience

- Glass & ceramic machining
- Optics Quality Control lab
- Apprentices training (3*3months)
- General support to DT detector projects

See link=> <https://ep-dep-dt.web.cern.ch/thin-film-glass-service>

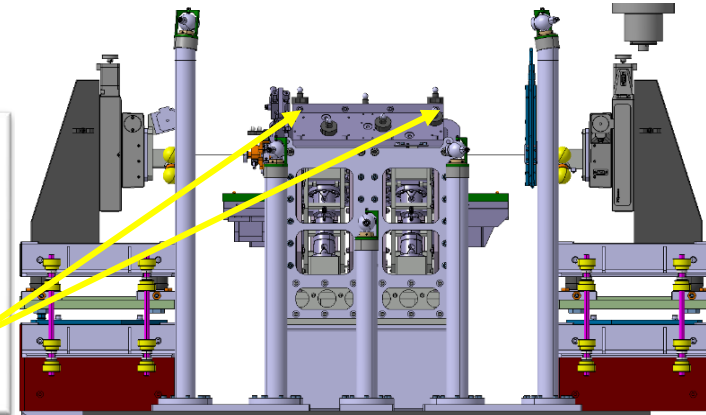
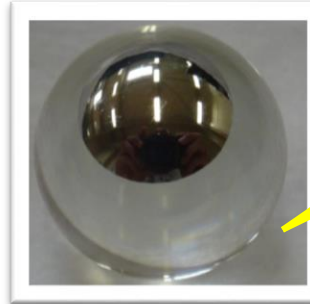


TFG current projects: *Reflective coatings*

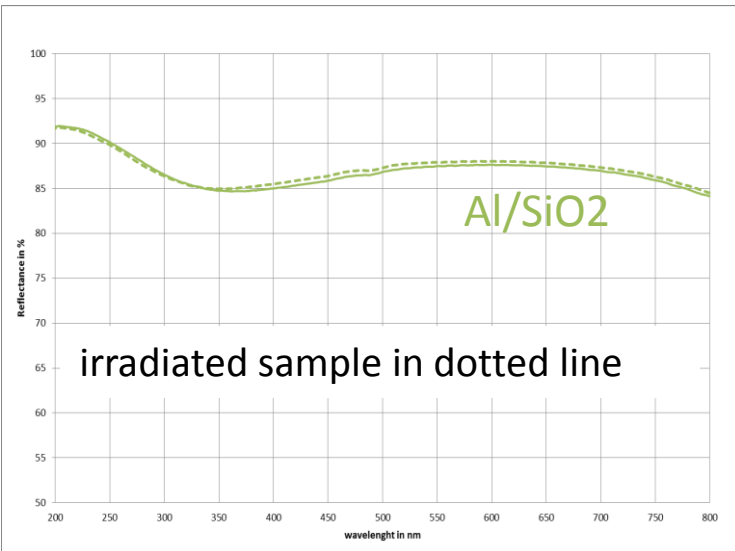
Reflective coating of survey team alignment spheres (EN-ACE-SU)

- High index glass balls used as alignment spheres.
- Reflective layer (AL) combined with a dielectric protection (SiO₂) is applied to improve the intensity of reflected laser beam.
- First series produced in April.

Coated Glass Balls
-> 0.5 inch target

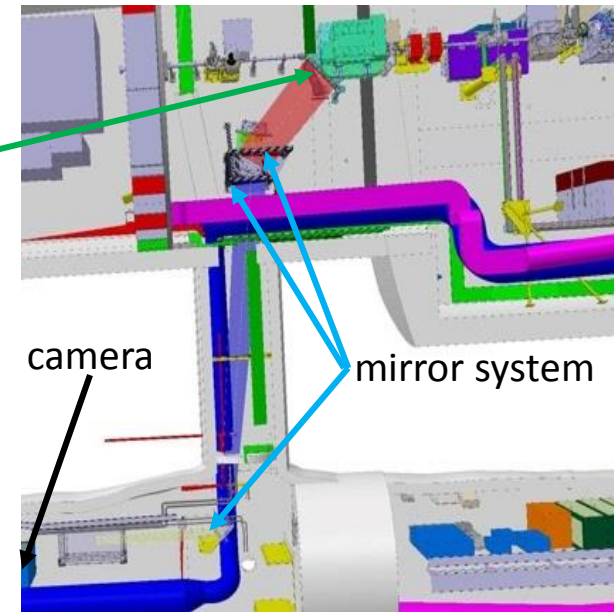


Effect of irradiation on reflective coatings



Radiation hard mirror system for AWAKE

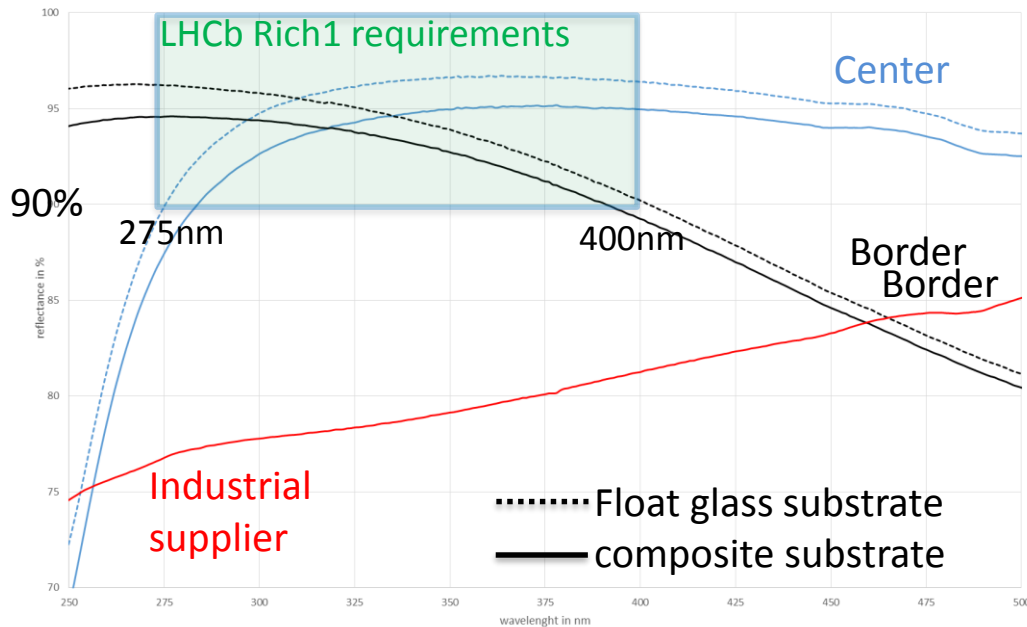
- Accelerated electrons (plasma Wakefield) are deflected (dipole magnet) onto a **scintillator screen**
- Camera is placed “far away” from the beam.
- Optical transport line (3 large mirrors) is needed
- Irradiated mirror samples checked on performance loss.
- Coating of mirror system planned for July 2017



TFG current projects: *LHCb RICH1 upgrade*

R&D for LHCb RICH1 optics system

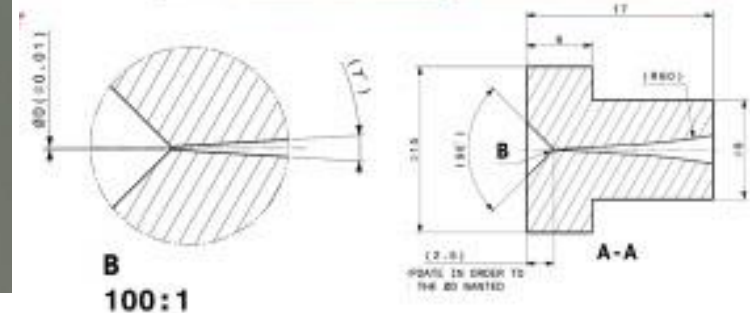
- ✓ Define recipe for enhanced protected coating according to requirements: Reflectance >90% in the range of 275nm to 400nm ✓
- ✓ Test coating on real size flat mirror (Cr, Al, SiO₂, HfO₂) ✓
- ✓ Overcome problem of big spherical mirrors (thinner layers @ borders) ✓
- ✓ Test coatings on composite samples ✓
- Production

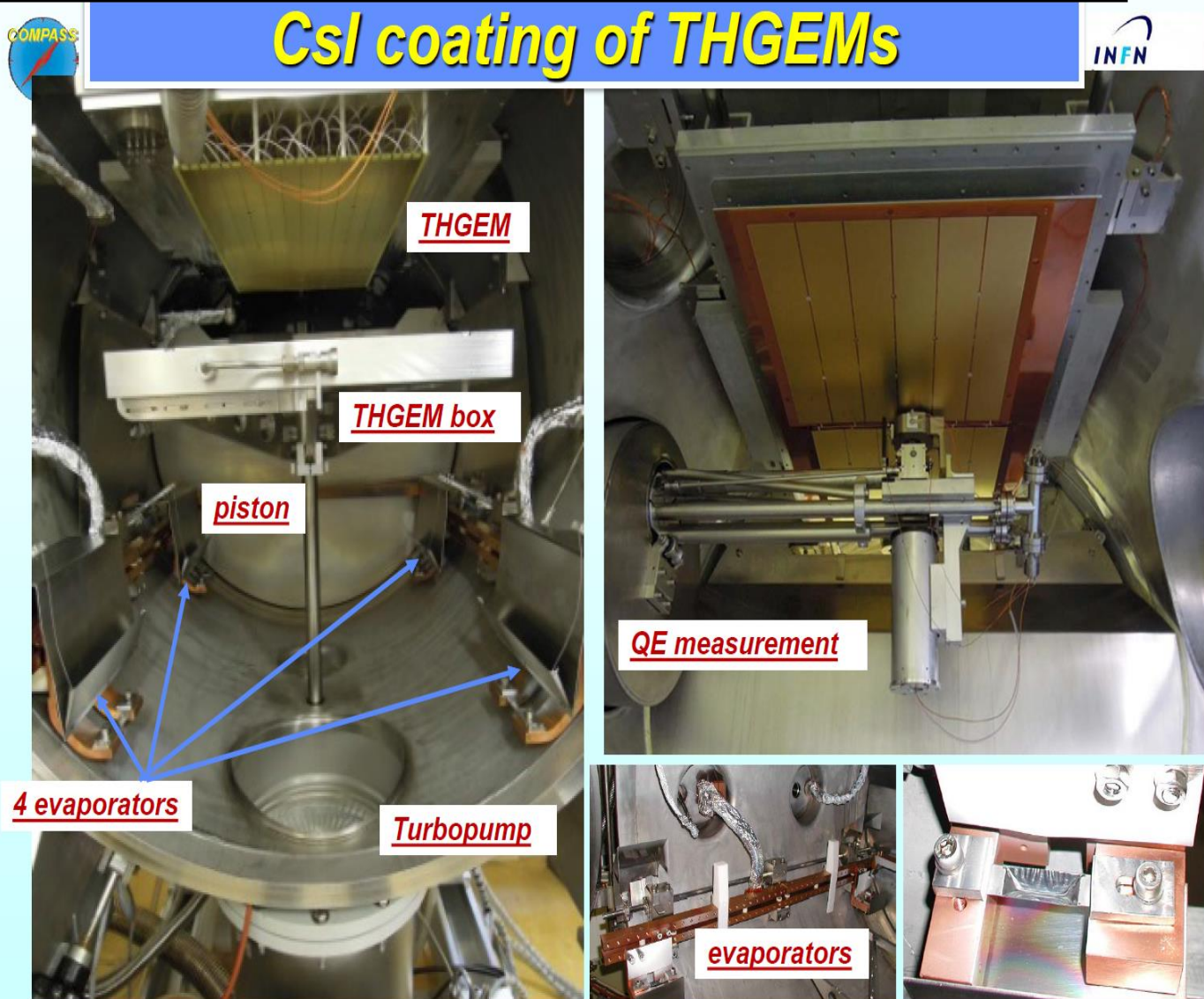


"Micro-buses" gas injection project:

(For: LEAR/ AD/ ISR/ Fair/ PANDA/ Fermilab)

- Gold layer (poor adherence) is applied on the needle like conical steel piece. This demoulding layer (functional layer) will allow in the end to separate the microbuses copper pieces from the initial conical part.
- After some testing in 2016 we started now production (30 units)





Philadelphia, 12/10/2017 - 6th International Conference on Micro Pattern Gaseous Detectors, MPGD 2017 Fulvio TESSAROTTO 14

2015:
R&D for Photocathode coating with Caesium Iodide (CsI) on COMPASS THICKGEM cathodes

2016:
COMPASS production

2017:
COMPASS spare production

Future:
Generic CsI R&D with COMPASS collaboration

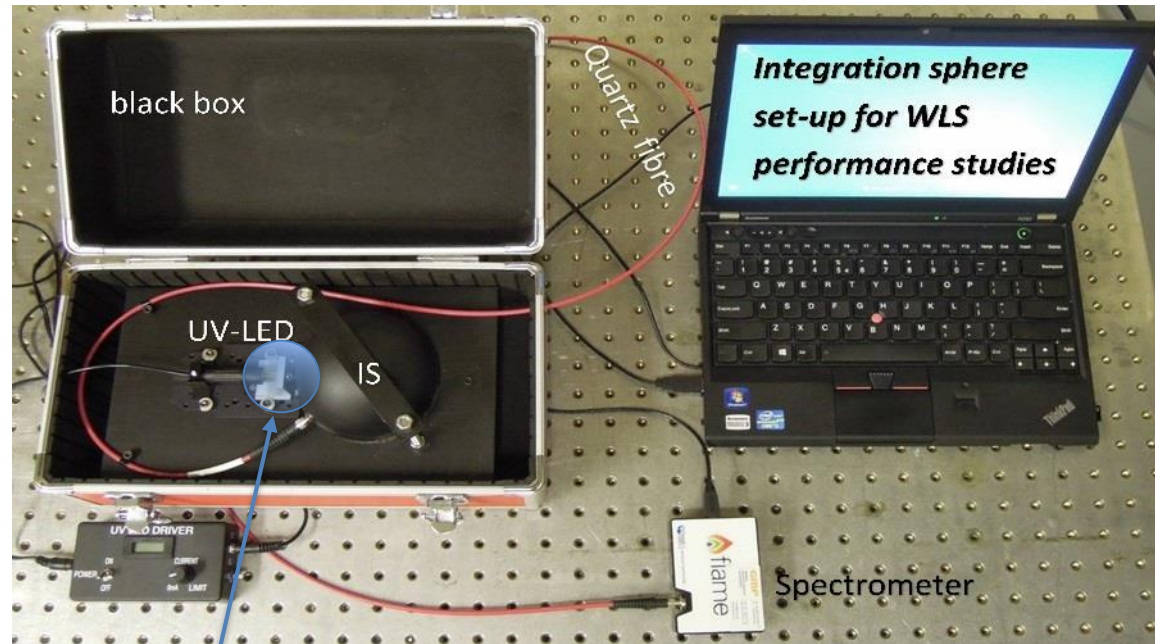
Since 2016:
Close collaboration with RD51 for picosecond detector R&D (see Eraldo presentation)

Optimisation study for wavelength shifting (WLS) layers in liquid Argon application

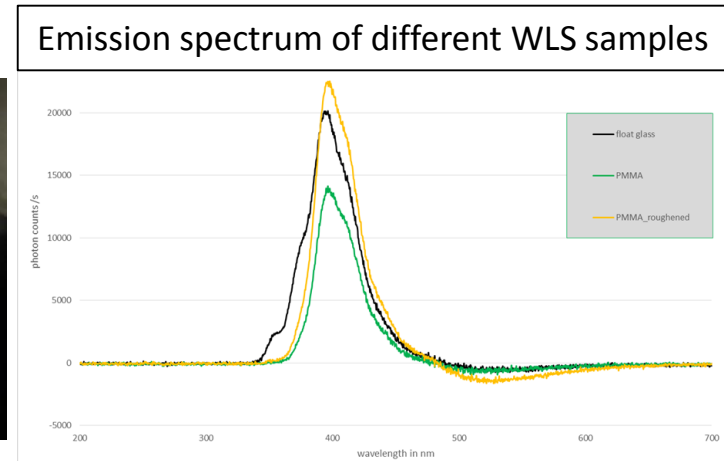
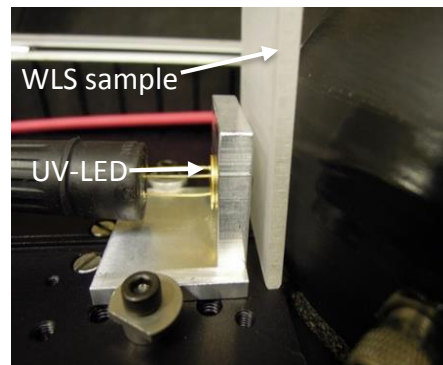
- longstanding experience with WLS coatings on PM's for RICH detectors
- Recent use of PM's in liquid argon environment for *dark matter* and *neutrino experiments* triggered the effort for a more detailed study
- ✓ A set-up to compare the converting efficiency (far UV light to the visible) of these WLS layers has been build
- ✓ More intense study will start soon, including liquid nitrogen dipping

Objective:

- Improve initial performance (coating parameters, substrate nature, surface preparation)
- Reduce aging in liquid argon use



Detail



Based on our expertise with optical fibre handling:
(coating / machining/ gluing/ assembly and characterisation)

- We contributed to simplified fibre based prototype with BE-BI doctoral student in 2015
- Agreed to take over prototype development and construction for “**scintillating fibre based beam monitor**” (2017 with common TTE)
 - First functional prototype for September 2018
 - 3 more units for **Neutrino platform** April 2018

Standard device (approved BE-BI project) should replace all existing MWPC beam monitors in the different test beam areas (~100 units).

EP-TFG contribution to this detector production tbd.

