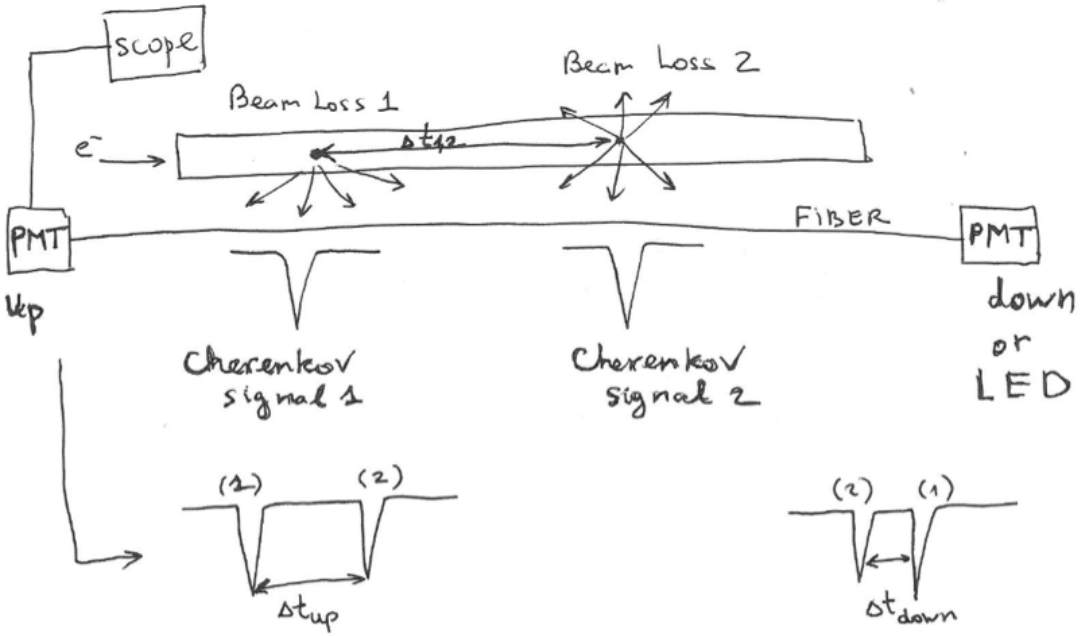
Beam Loss Monitor

Principe Physique

Particles originated from electromagnetic shower (caused by the lost particles interacting in the vacuum chamber walls) penetrate the optical fiber and generate Cherenkov (scintillation) radiation.



Downstream time difference is <u>compressed</u> while upstream one is <u>expanded</u>.

Upstream PMT is used to get better FBLM position resolution.

<u>Measurements of the beam loss position can be done by</u>

knowing time difference between the BL signal and reference signal (loss signal produced by inserting a known devices)

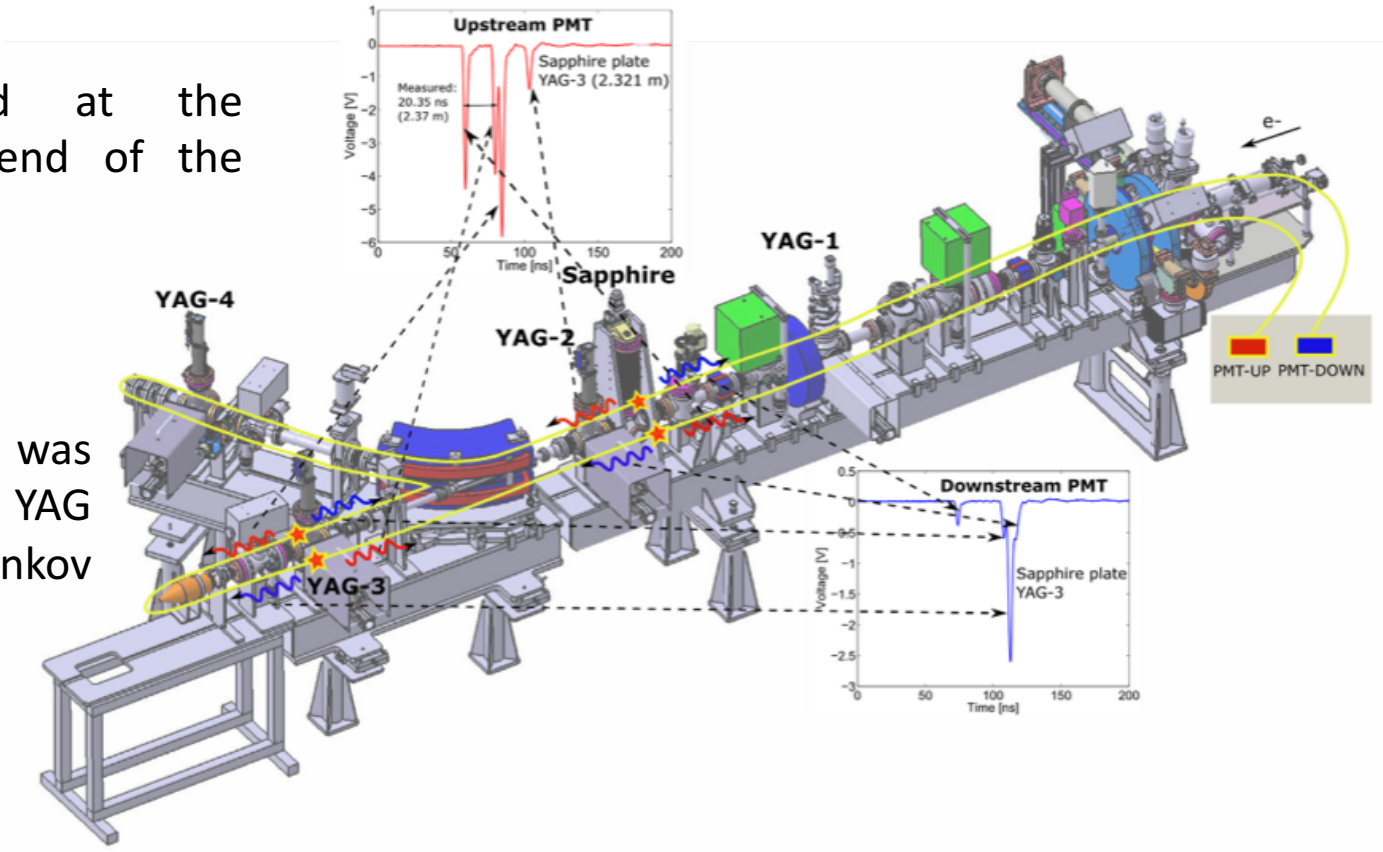
- having master trigger (beam arrival time).

Principe Physique

The fiber with a length of 25 meters was installed alongside the vacuum chamber to cover continuously the total length of the photoinjector.

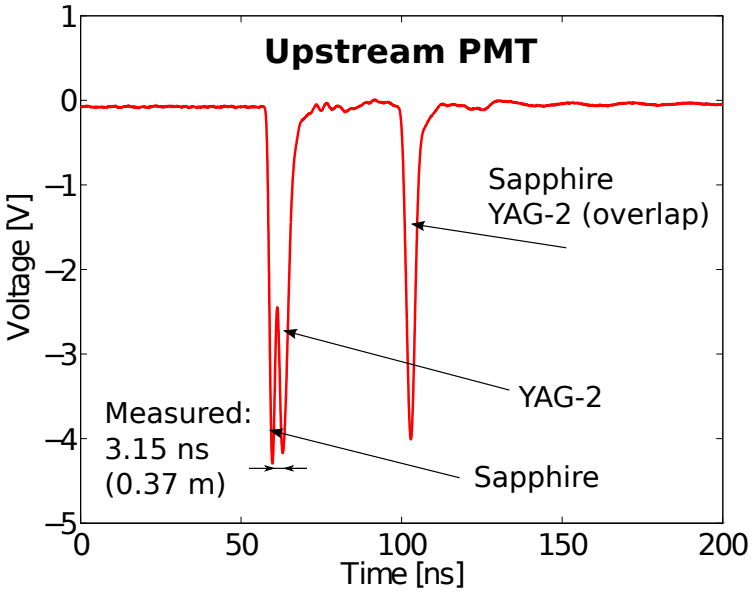
PMTs are connected at the upstream/downstream end of the fiber.

Position calibration was carried out using the YAG screens and Cherenkov monitor.

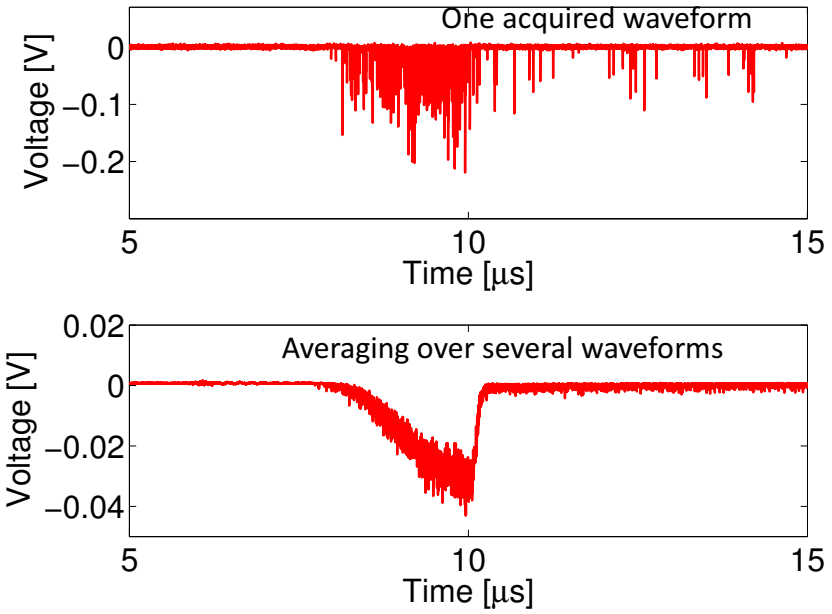


Principe Physique (tests@PHIL)

Beam loss signal (averaged) generated by the Sapphire plate and the YAG-2 screen spaced by 0.282 m.



Beam loss signal generated by the dark current (60 MV/m). The RF pulse duration is 3 µs which is clearly visible on the waveform.



The measured position accuracy allows resolving the beam losses occurring as close as 30 – 40 cm with the 25 m fiber along the vacuum chamber.

État d'avancement

- **Commandes d'équipement:** all main equipment is ordered (fibers, PMT, scint…)

To order: 3 Wavecatchers + Scope(test R&S)

- **Installation mécanique:** Baie 5. Fibers + Scint will be installed after baking of the vacuum system. PMT-PS boxes preconfigured; rack assebmly ongoing
- **Installation électronique:** references for cabling is checked (july 2018), automates to be installed, rack installation this fall (after the Tests CC).
- **Tests CC (date prévue):** Separate checks of the Wavecatcher/RedPitaya with TANGO are done, the final check of the whole system is ongoing. To be finished before the end of the year.
- **IHM:** initial – MATLAB, to be developed in python (stability).

Étapes de mise en service

- **Durée des tests nécessaires avant le faisceau:** tests of the system after installation => 2 days. Could be done in parallel with other tests.
- **Date(s) prévue:** depends on the planning
- **Durée des tests nécessaires avec le faisceau (heures, jours):** 1 day

Maintenance à prévoir

- Every “shut-down” check the whole system

Pannes possibles

- Broken fiber, PMT, problem with scintillator,

Network;

- DAQ problem: response from: WAC/RPI; Scope; automats; ()