Toward 10g exposure

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Purpose of 10g exposure

- To demonstrate the detector feasibility (referees request)
  - Demonstration that in 10g of NIT in 1 month there is no background
- Main requirements to achieve 0 (< 1) background
  - Pure emulsion gel (fog level <= 0.1 /(10 micron)^3)
  - Pouring and development at LNGS underground in sufficiently clean conditions
  - Low fading in 1 month
    - Cooling system required
  - No radioactivity background (should be less then intrinsic C_{14})
    - Shielding
    - Use of low radioactive materials
    - Radon free

Emulsions status

- FOG level for the most recent production
  - Poured, developed and scanned in Nagoya: 0.2 (almost ok)
  - Poured, developed in LNGS, scanned in Napoli 1.2 (not ok) (Pouring Oct-2016)
- Possible reasons for the discrepancy
  - Different measurement method (virtual blobs erasing not applied yet)
  - Different emulsion treatment – pouring and development conditions
  - Gel purity deterioration after additional time (aging) and/or transportation from Japan
- Fog discrepancy to be understood
- Fading tests are ongoing now

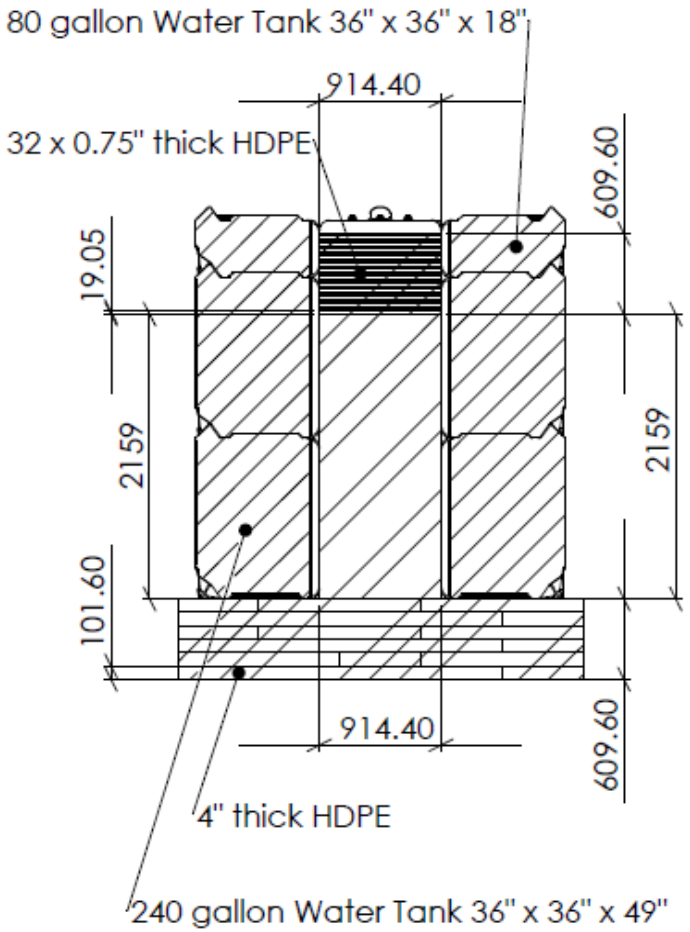
Emulsion facility at LNGS

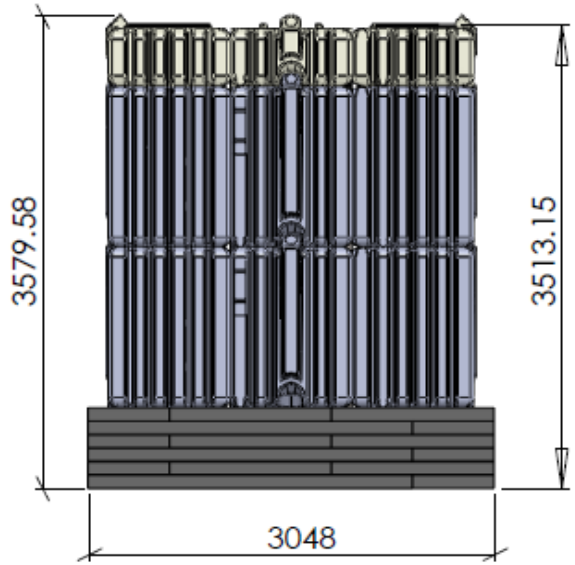
- Old facility is available until Feb-2017
- Improvements done in old facility in 2016
  - Humidity control
  - 2 new thermostatic baths
  - Drying box is ready
  - Ventilation system is cleaned
  - No additional major improvements on clean environment are possible on the old site
- New site probably ready at Feb 2017
- Improvements expected on the new site
  - More lean room conditions
  - New climatic chamber (with temperature and humidity control) is expected

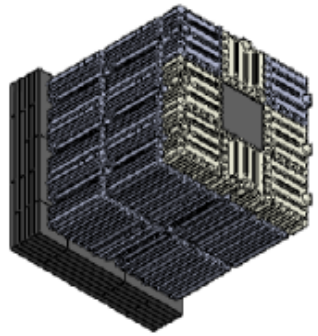
Shielding status

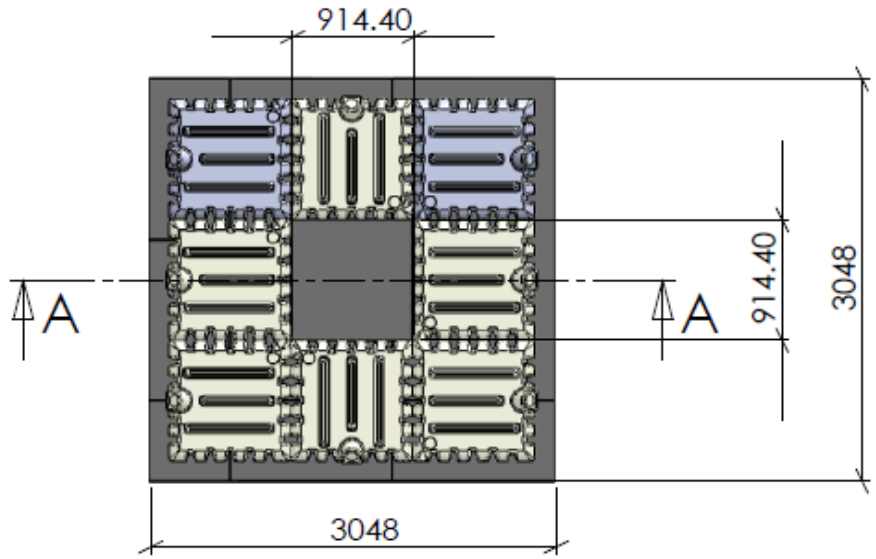
- We can use the structure and polyethylene from former DarkSide10 shielding
- After 15-Nov will be moved to new position (behind Xenon) and ready for our use
- Idea is to use OPERA bricks (lead) in addition to DS10 polyethylene
- Some additional structure for lead support I required anyway
- Tentative schedule: to define the engineering project and create the structure to the end of the 2016

SECTION A-A
SCALE 1 : 50





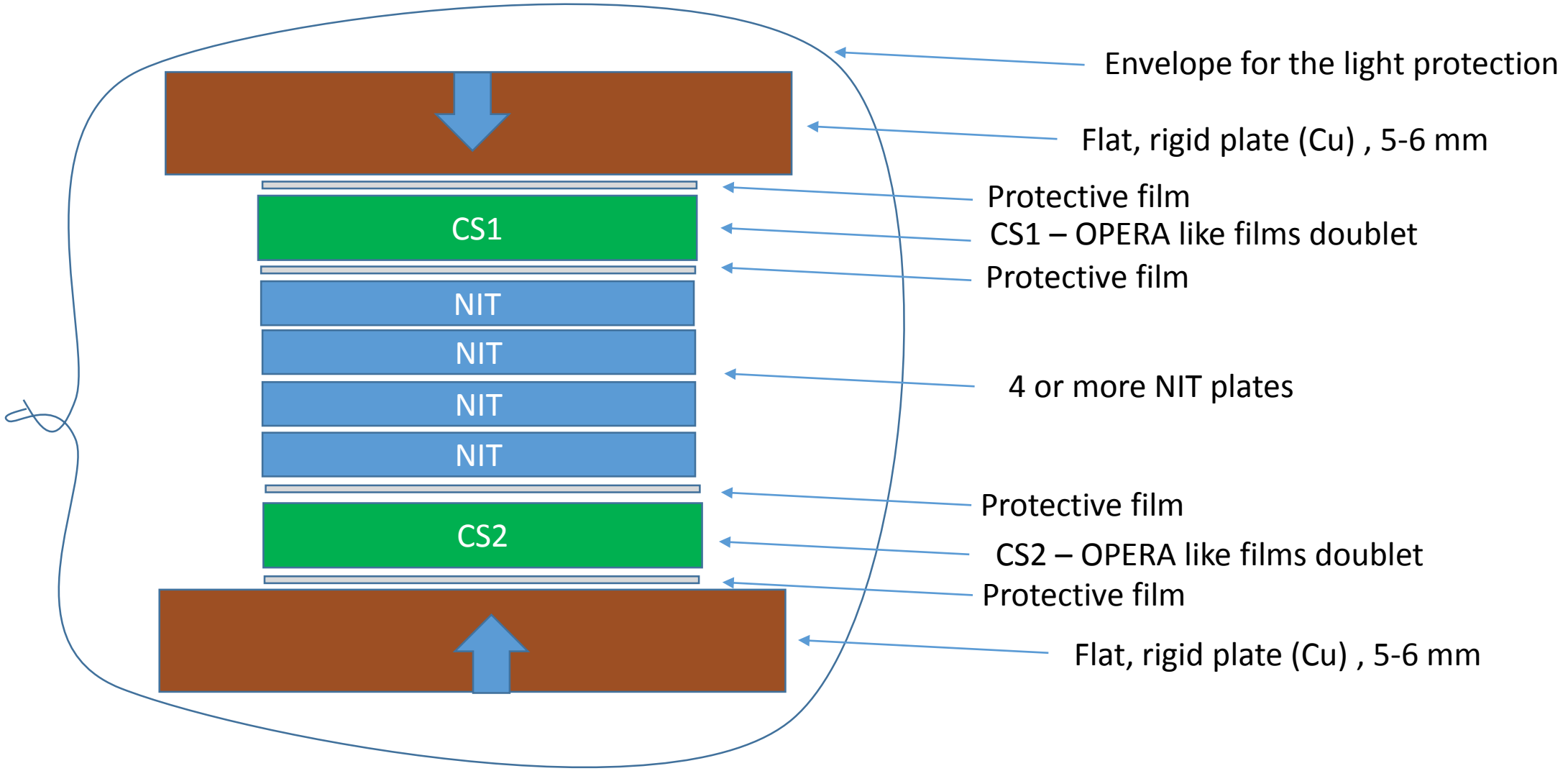




Assembling elements for 10g exposure

- NIT films – sensitive elements where we measure the background level
- CS1 and CS2 – MIPs monitoring during the exposure
- Protective films – to avoid the direct contact of MIP and NIT emulsions if it’s dangerous
- Cu plates – to keep the assembling flat and mechanically robust, temperature stabilization for the short periods (if we open and close the cooling box)
- The idea is to prepare 4 assembling's like this of A4/8 size and exposure them for the different periods: 1, 2 months

Possible assembling for the September test beam



Tentative schedule
(based on some assumptions not completely under our control)

- End of 2016
  - define and construct the shielding
  - Complete the gel and fading studies
- Jan – Feb
  - Moving of the emulsion facility
- As soon as we are ready with shielding the first samples could be poured and loaded for testing of the full procedure
- The conclusive test (10 g) can be the next one