

ProtoDUNE - CPA / FC / HV Review  
**CERN, 9-10 November 2016**

Beam Plug System - Q&A

**In view of the presentations today and available documentation, the review panel proposes a set of questions to the project team to be answered tomorrow in the Q&A session. The goal of these questions is to understand better some identified issues and therefore be able to write a concise report at the end of the review.**

- Mar Capeans, Chair (CERN EP)
- Sebastien Murphy (ETHZ)
- Fernando Baltasar (CERN HSE)
- Wolfgang Klempt (CERN EP)
- Filippo Resnati (CERN EP)
- B.Baller (Fermilab)
- G.Gallo (Fermilab)
- R.Preece (STFC)

# Review Question

1. When will you be ready to review the beamplug?
2. This part as it is very innovative and critical, it needs careful revision. Is any test foreseen for validating the design?
3. Would you consider making a full sized test at 1.3 times design voltage in a N<sub>2</sub> atmosphere and with an appropriate beam?

1. When will you be ready to review the beam plug?

- We have two system tests scheduled for early 2016. One is an in-beam test with interior N2 fill and external oil. Another test of three-ring subsection unit in LAr.
- We would like to have these test results in hand and digested for the review, but could review before the 35 Ton Phase 2 program.
- Estimated time frame would be late February or March 2017.

2. This part as it is very innovative and critical, it needs careful revision. Is any test foreseen for validating the design?

Yes we do have a slate of tests for design validation, some already completed and some planned through Spring 2017. In addition to the tests shown in the slides, these and other key tests are planned:

1. Leak check beam plug at LN temperature.
2. Pressure test at 2X operating pressure at LN temperature.
3. High voltage test of a subsection portion of the beam plug in LAr at BLANCHE. This will comprise three electrode rings bonded to two glass composite sections.

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4. Entire part will be immersed in LAr and will have open ends. Test will be at ~60 kV (30 kV per section).
5. In-beam high voltage test of full-scale beam plug at ~150 kV. Beam plug interior at nitrogen gas environment, entire beam plug immersed in oil. Test will isolate performance of interior nitrogen volume of beam plug.
6. High voltage test of full-scale beam plug at nitrogen gas environment, entire beam plug immersed in LAr.

3. Would you consider making a full sized test at 1.3 times design voltage in a N<sub>2</sub> atmosphere and with an appropriate beam?
- This is a variation of a planned in-beam test at FNAL (see answer to question #2).
  - We would like to discuss this question further to better understand the nature and goals of the proposed test.