

Purity Monitors Installation (Update)

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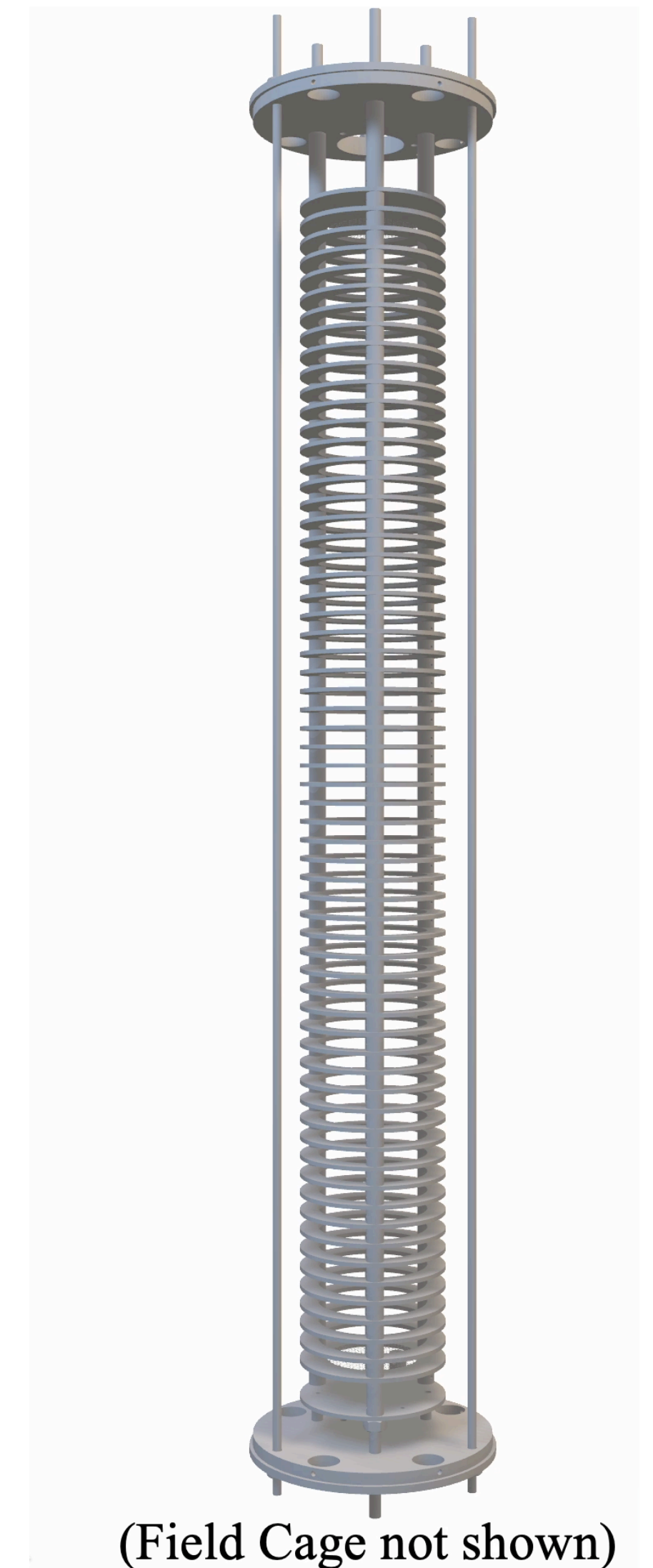


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Purity monitors for ProtoDUNE-II HD

- ProtoDUNE-I SP has 3 PrMs located inside the cryostat, outside the field cage, with the same length of 25 cm
- For ProtoDUNE-II HD, 2 of the 3 PrMs (top and middle) will be reused
 - Top PrM: remain as the top PrM
 - Middle PrM → Bottom PrM
- A long purity monitor (75 cm) will be installed as the new middle PrM
 - Reduce the systematic uncertainty in the absolute lifetime measurement
 - 4x longer drift distance, 60 field rings in total
- The long PrM has been shipped and assembled at CERN
 - Performance tests in vacuum and mechanic-robustness tests in LAr have been carried out, presented at the collaboration meeting



Installation plan

- Pull out PrM assembly out from ProtoDUNE-HD cryostat: **DONE**
- Disassemble the PrM assembly: **DONE**
- Replace the photocathode with new ones: **DONE**



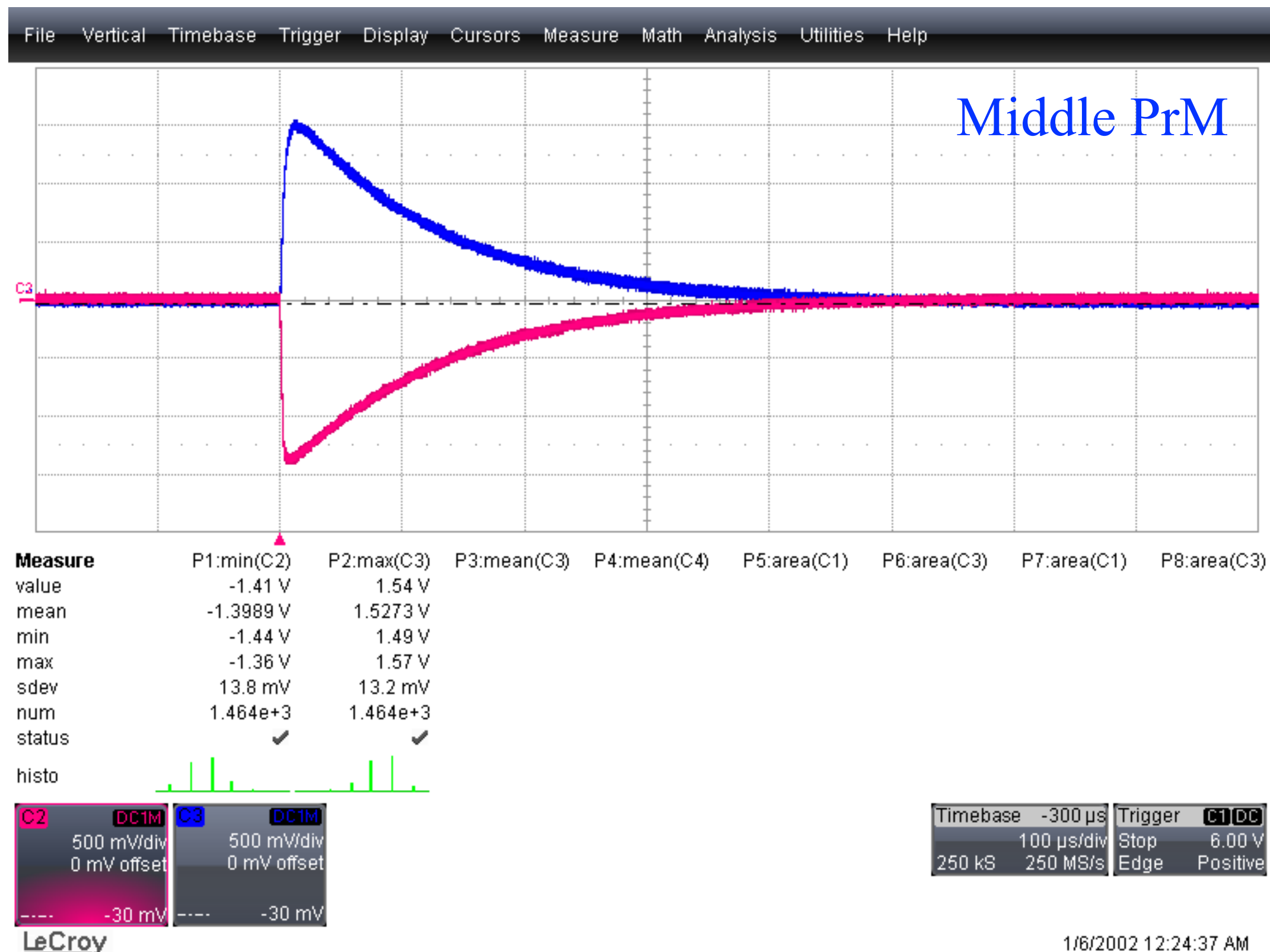
PrM assembly



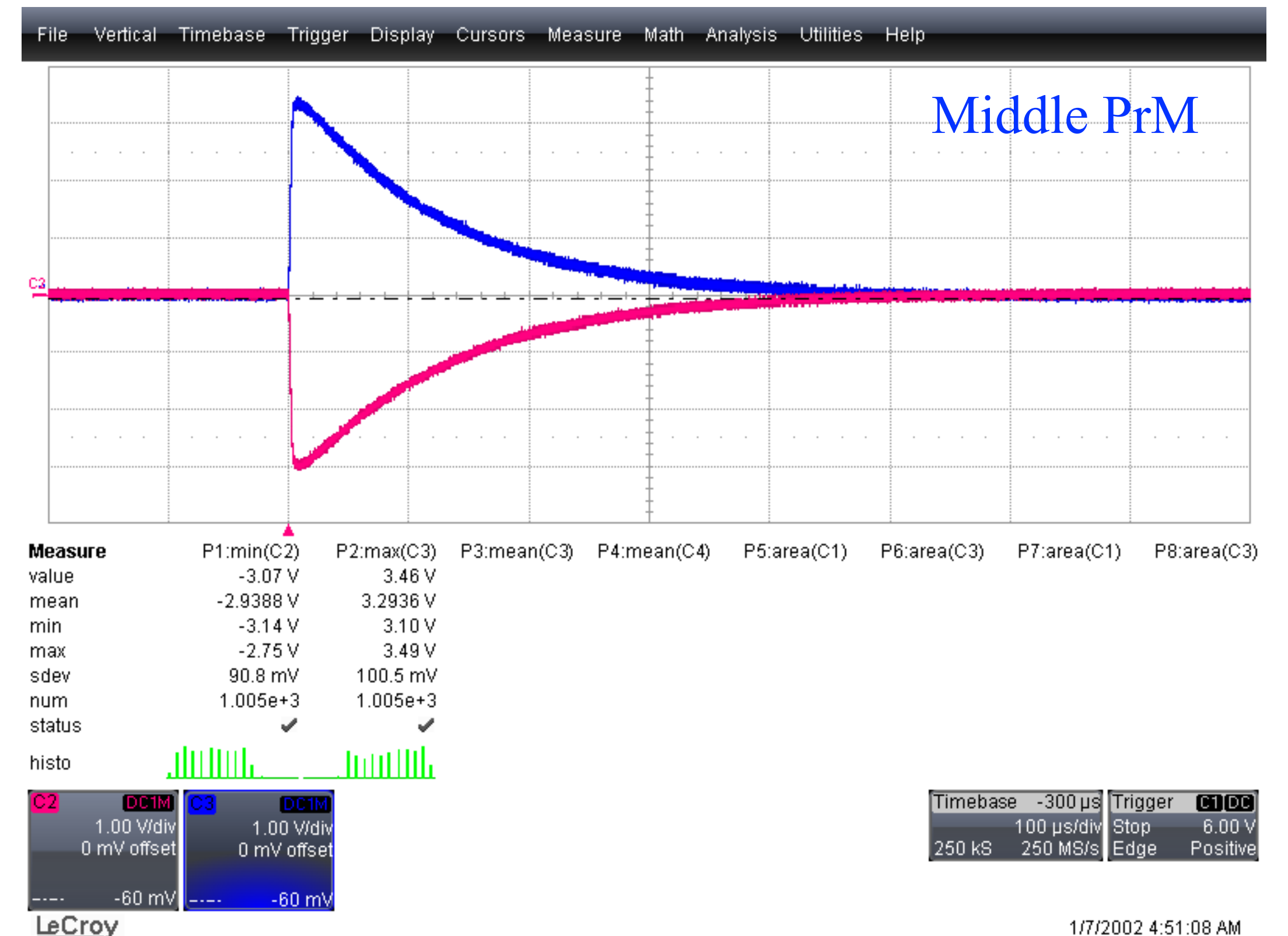
Installation plan

- Performance of the photocathodes were tested with the same high voltage and light intensity
 - New photocathode has larger signal as expected

Old photocathode



New photocathode

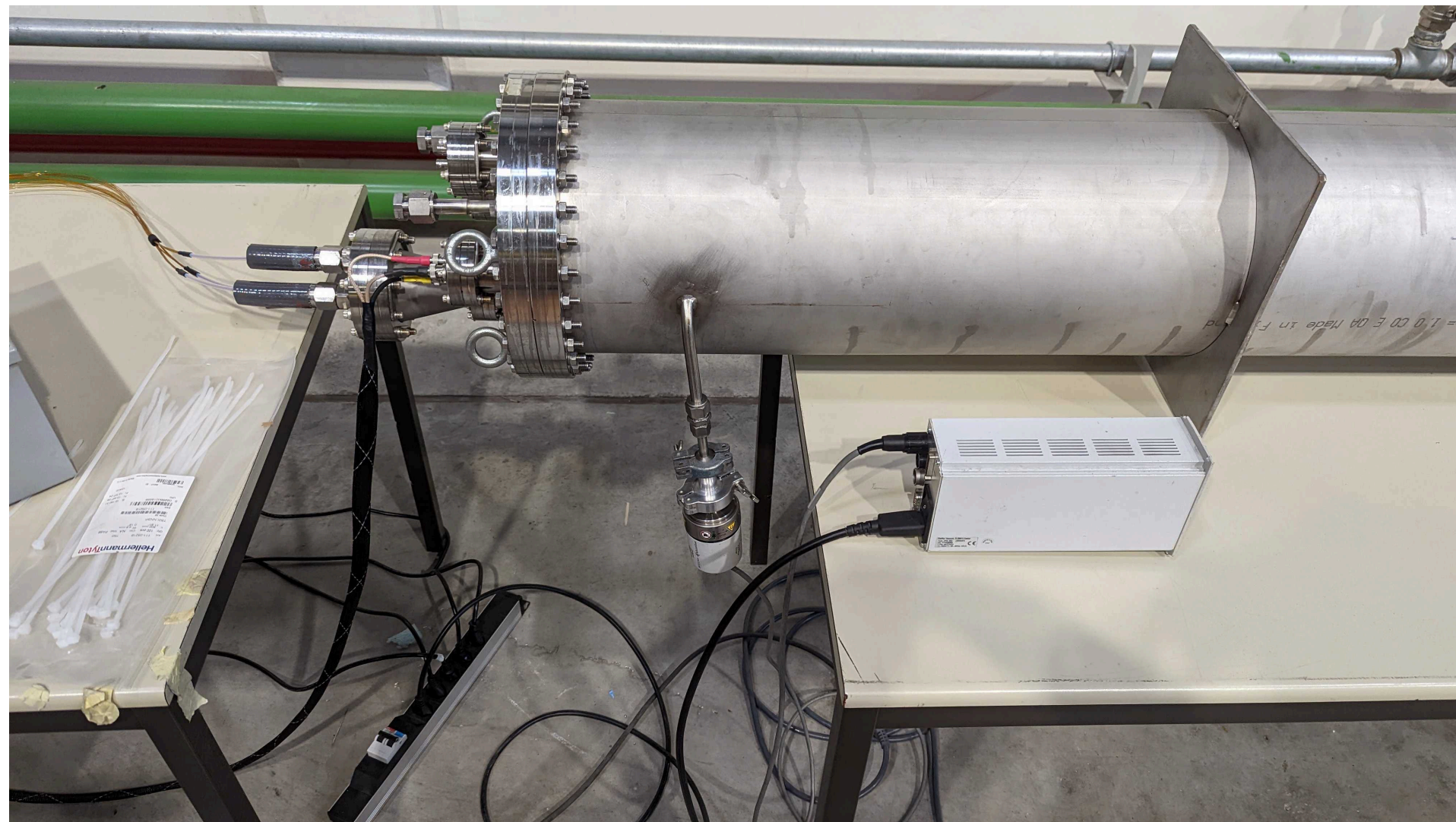


Installation plan

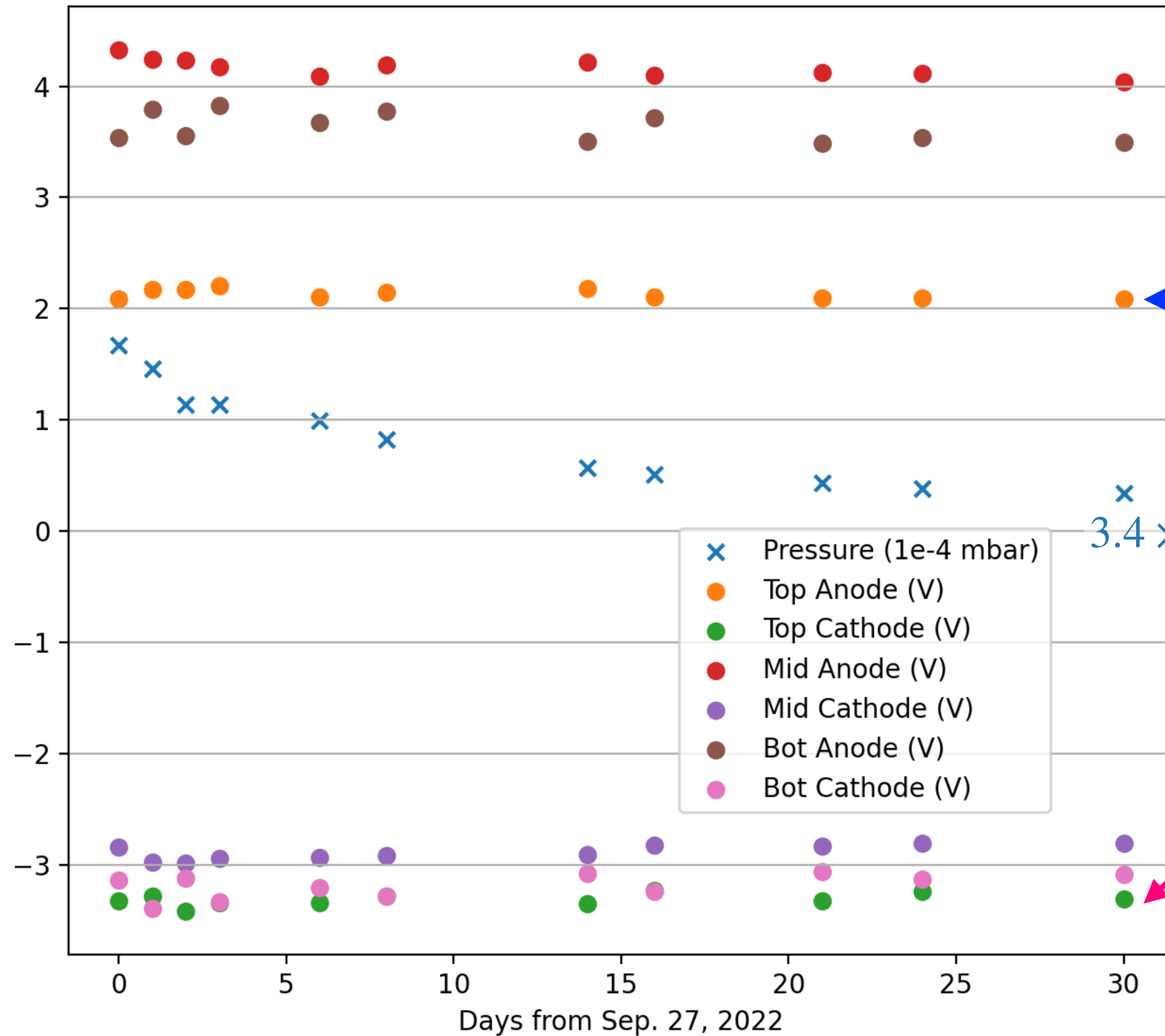
- Integrate the long PrM into the assembly: **DONE**
- Store the PrM assembly in the long pipe and wait for inserting to the cryostat
 - Storing PrM in the vacuum environment is better for the photocathode performance
 - The insertion could even wait until right before the filling, which is not settled yet



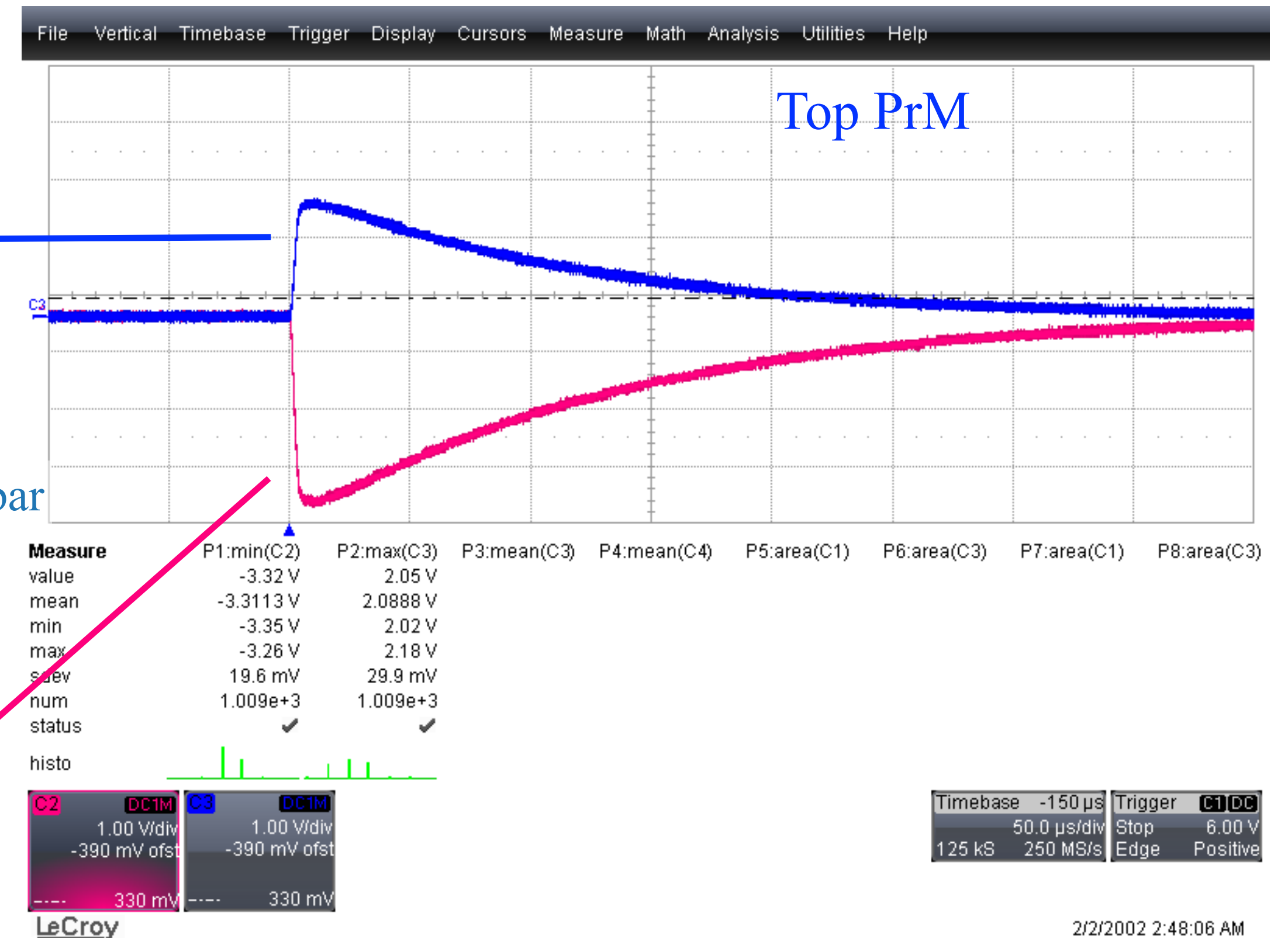
Installation plan



Installation plan



3.4×10^{-5} mbar



Installation plan

- Cables for the temperature sensors were assembled
 - Plan to assemble the temperature sensors and the feedthrough in Nov.
- Test the PrM assembly and temperature sensors in the long pipe



Summary

- The long purity monitor was shipped from UCI, and assembled at CERN
- The DAQ software is ready on the DAQ computer
- The PrM assembly is tested and stored in vacuum, and shows good performance for the tests over the last month
- Will fully assemble the temperature sensors, and then is prepared for the final insertion