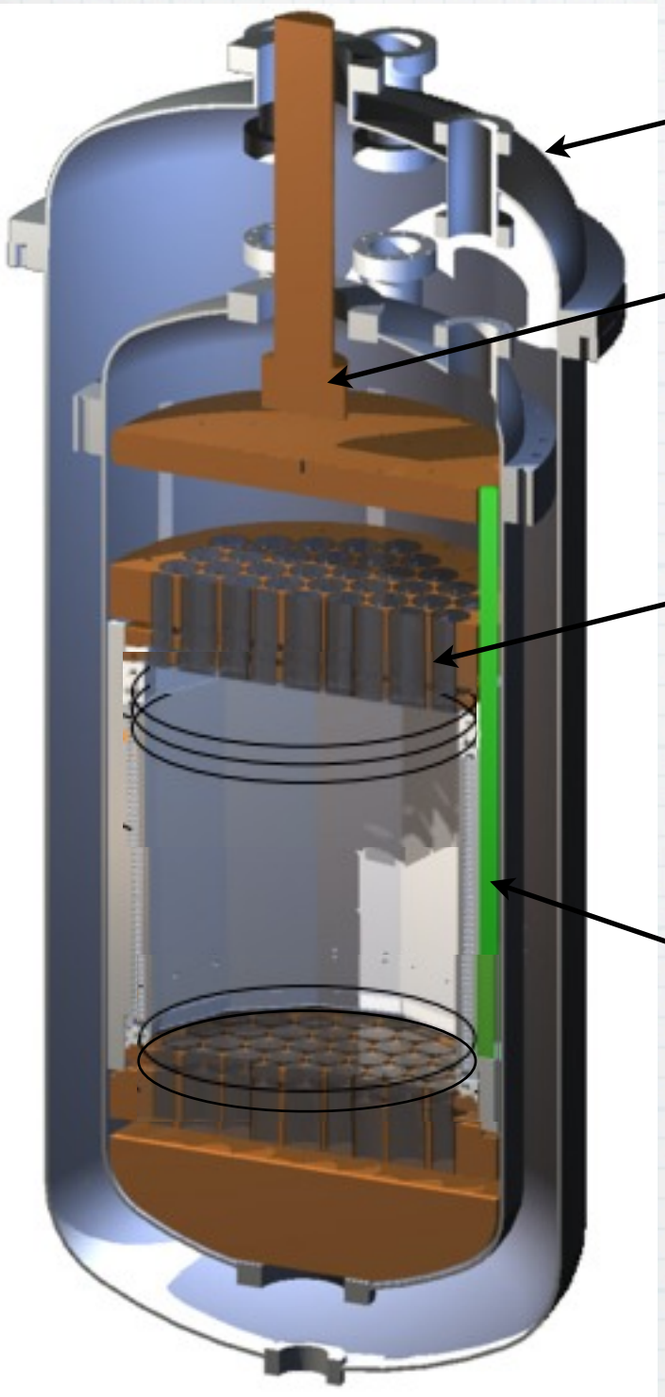
LUX Detector

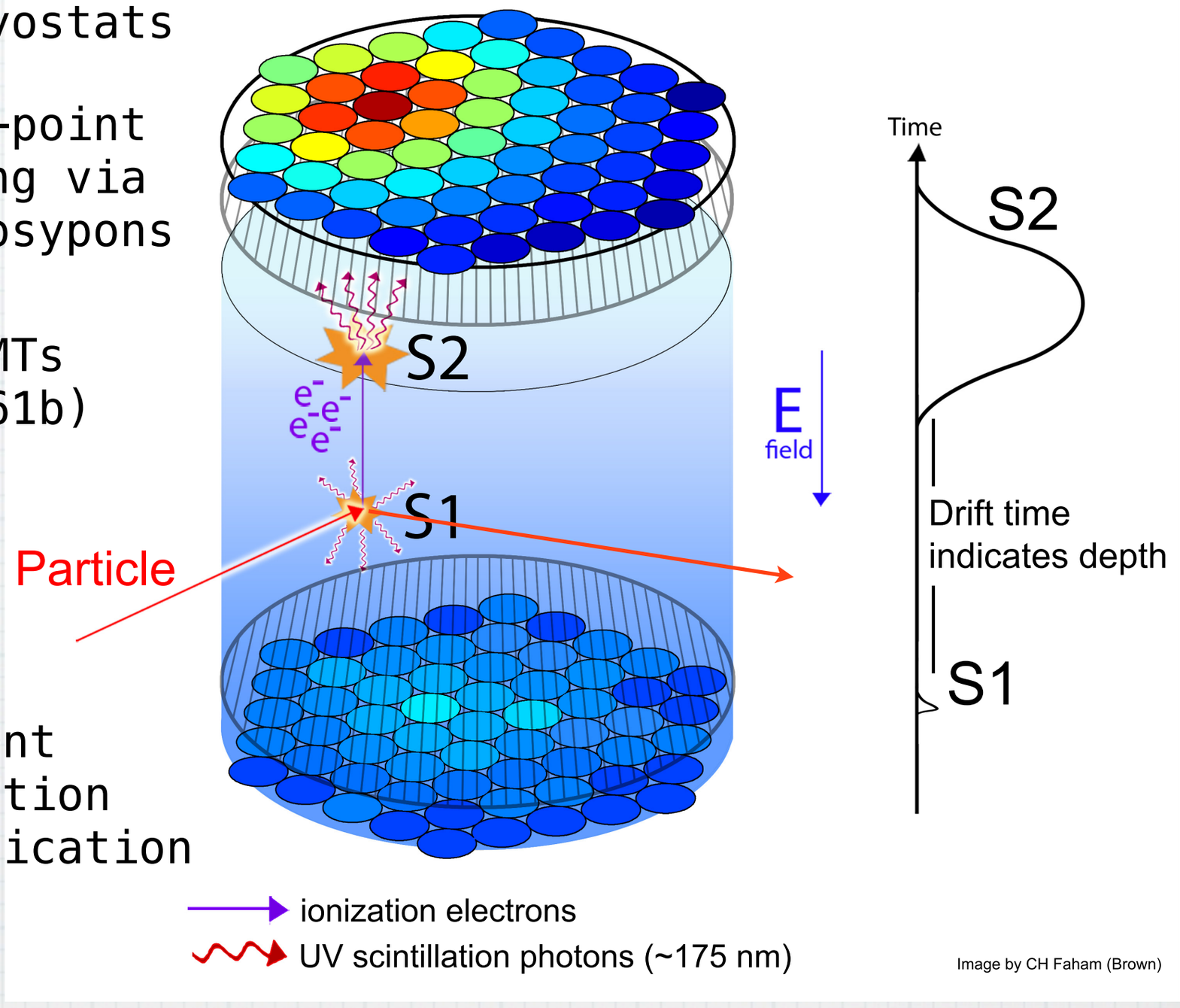
2012-06-11

Patrick Phelps

Everyone's work

LUX Overview



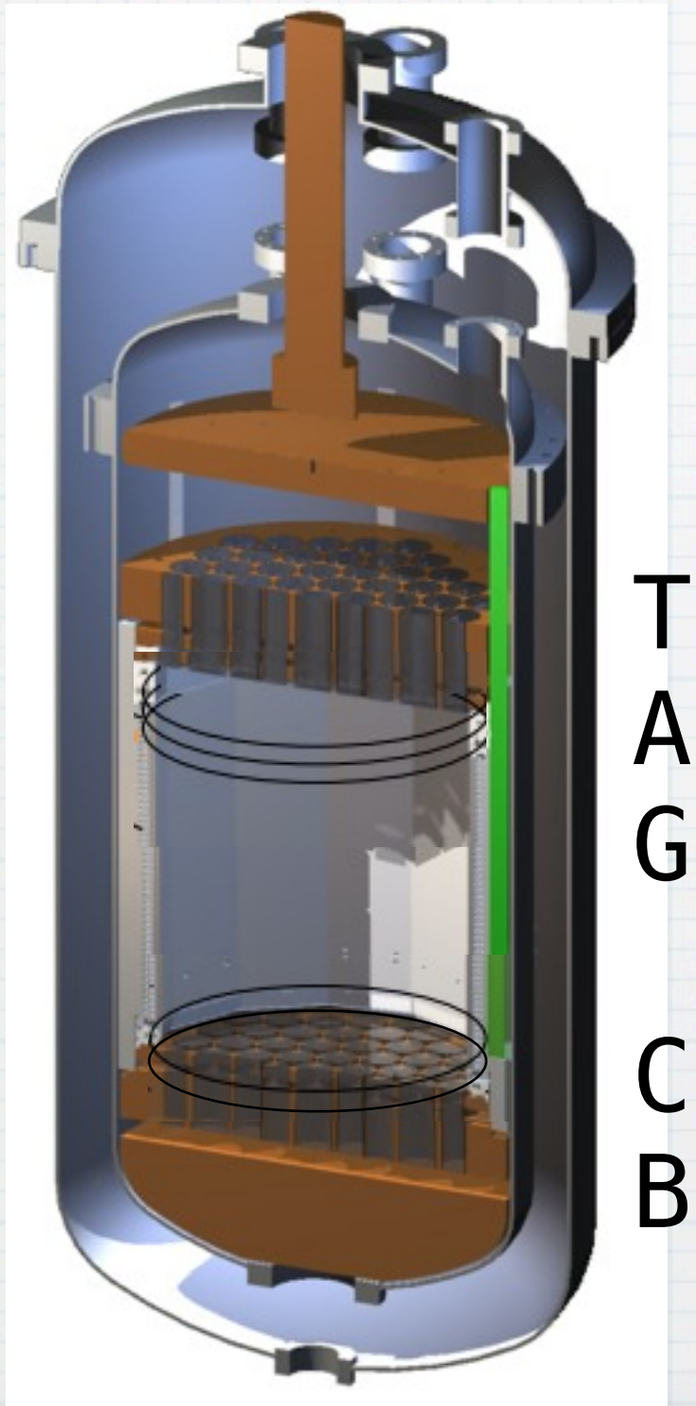


Where we were (Run 02)

* Successfully tested several major subsystems - HV, PMT, DAQ, ACRS, Instrumentation, Gas System, Online sampling system, Circulation system, Condensation and Cooling

* Most systems performed admirably
* Small number of systems revealed need for improvement
* We are now well on our way to being ready for Run 03

Grids - Run 02

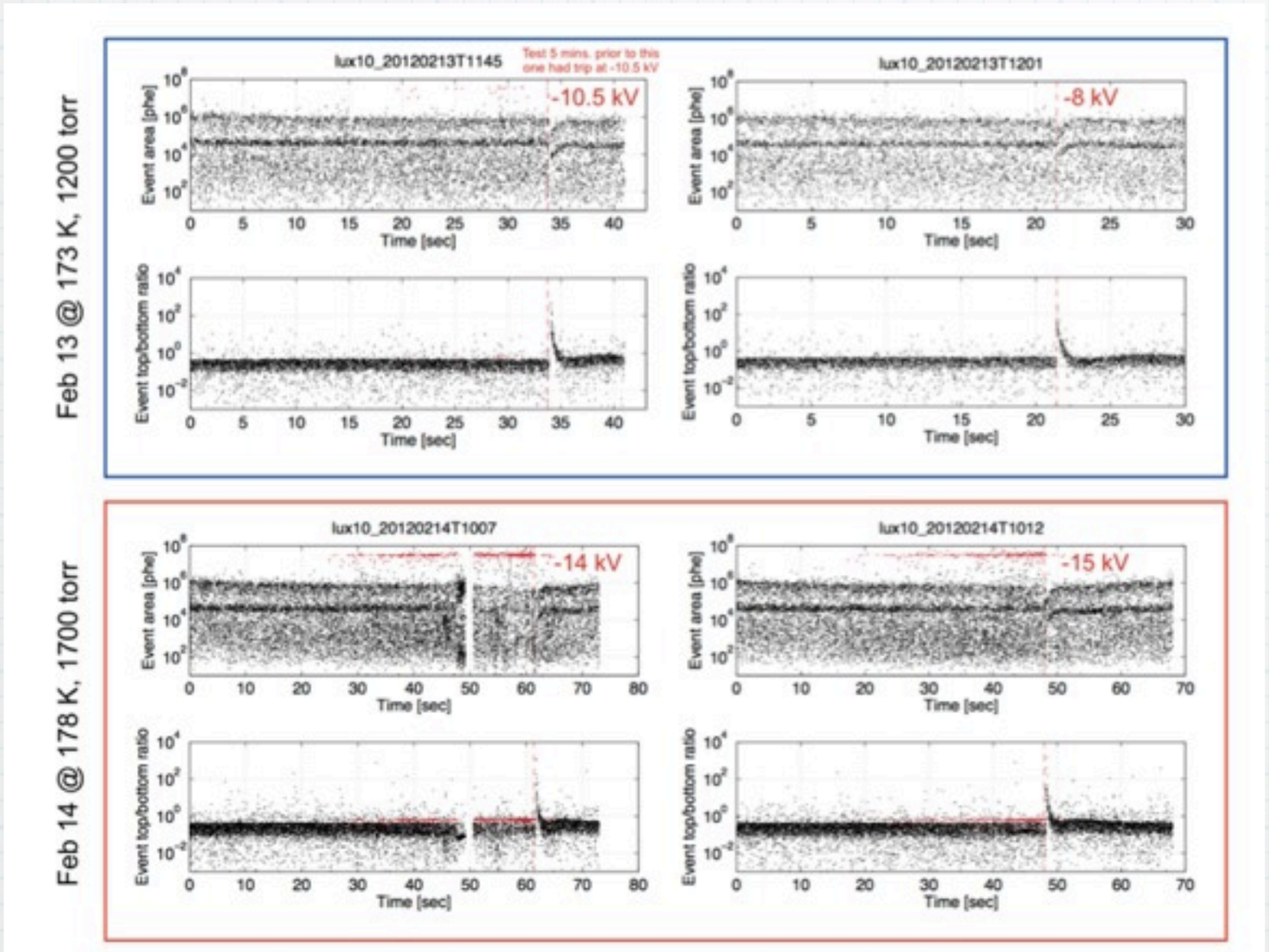


Cathode electroluminescence

Light production -8kV

$$E_{wire} = (E_+ - E_-)\frac{p}{\pi d}$$

Grids - Run 02



Cathode electroluminescence

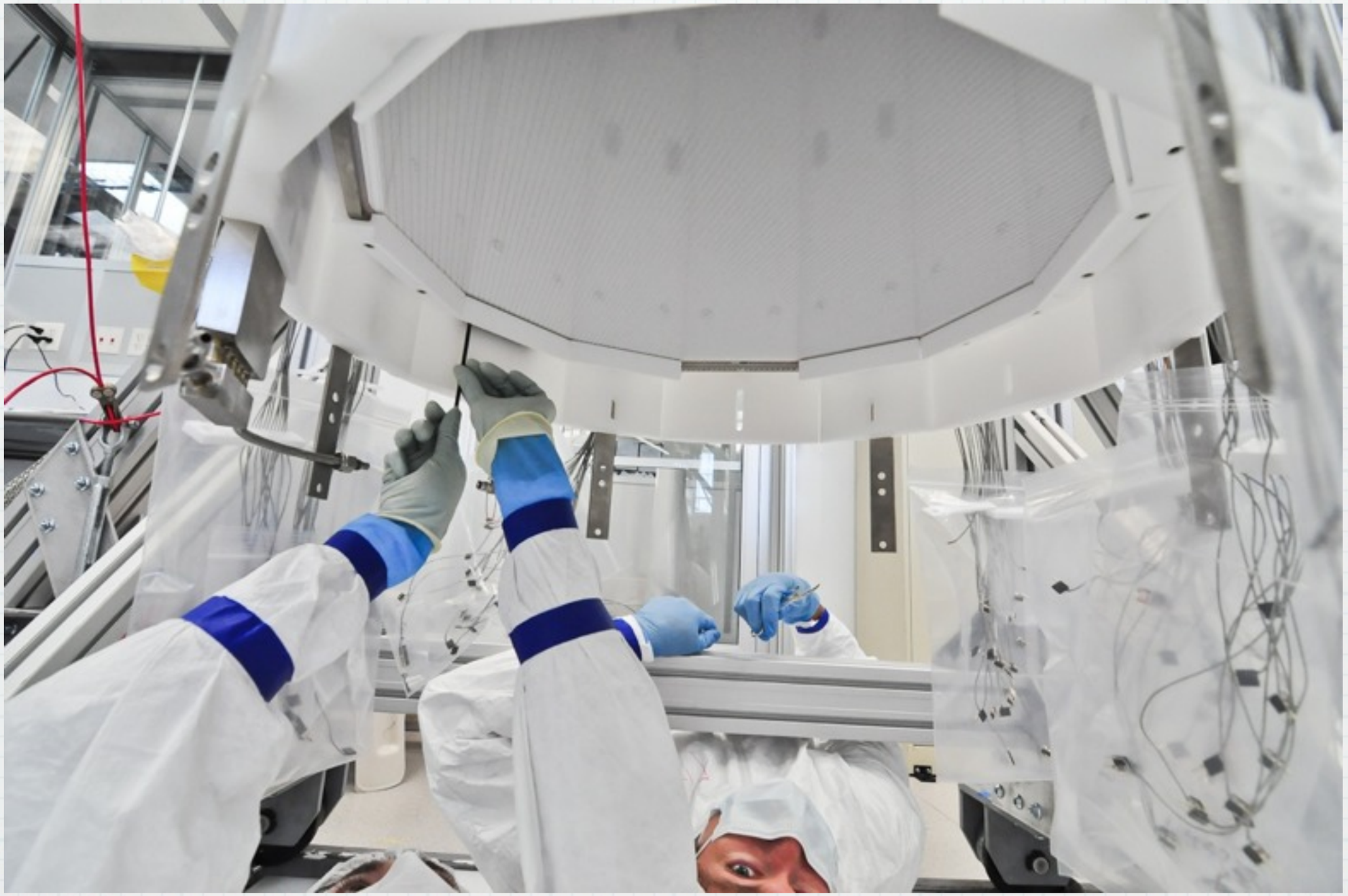
Light production -8kV

$$E_{wire} = (E_+ - E_-)\frac{p}{\pi d}$$

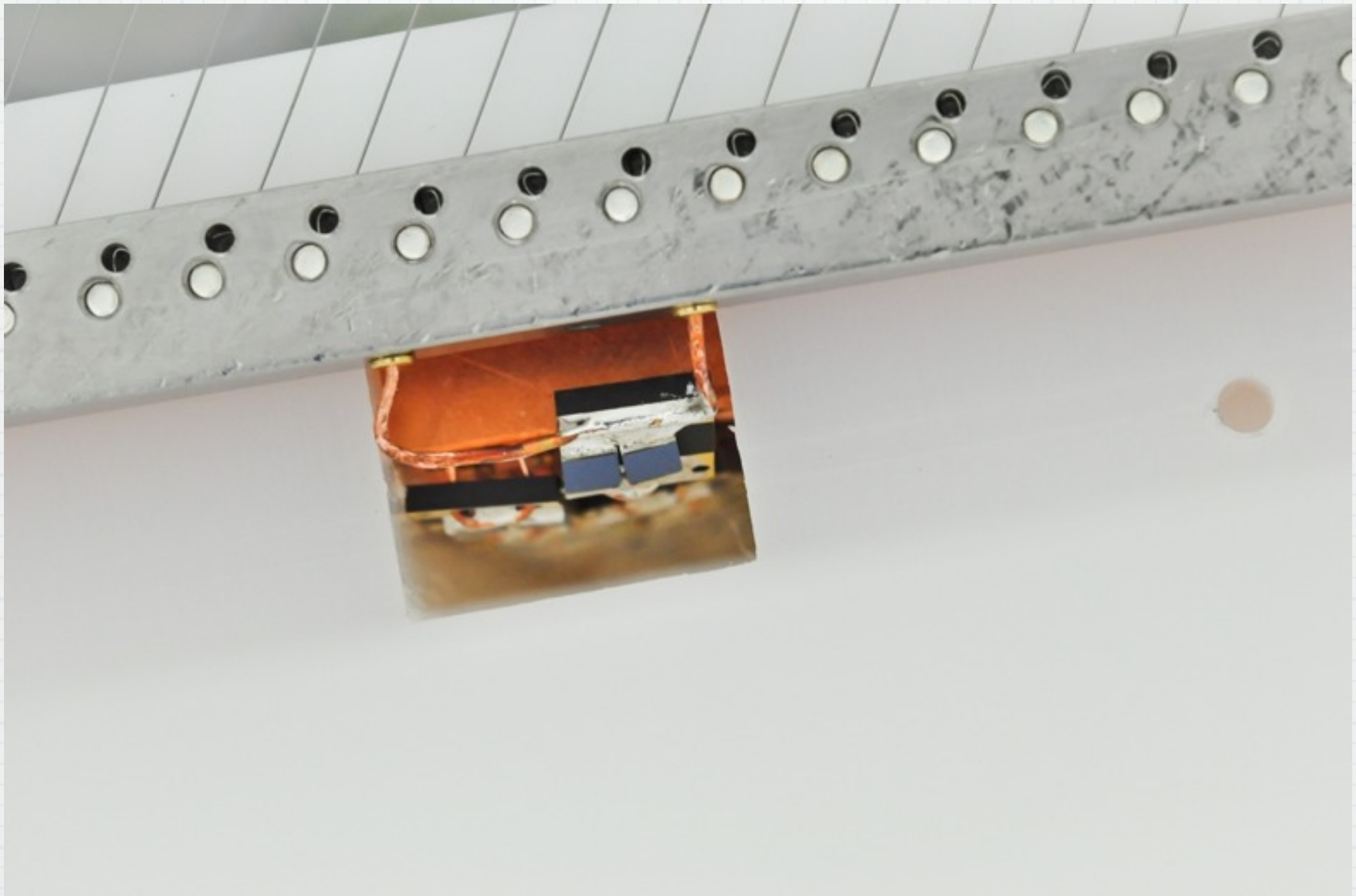
Grids - upgraded and reinstalled

* Switch Cathode and Bottom
* Increase Cathode wire diameter - 100 micron to 206 micron (fine finish)
* Net effect x4 decrease in field around the wires, less asperities
* Anode reconnection in complete

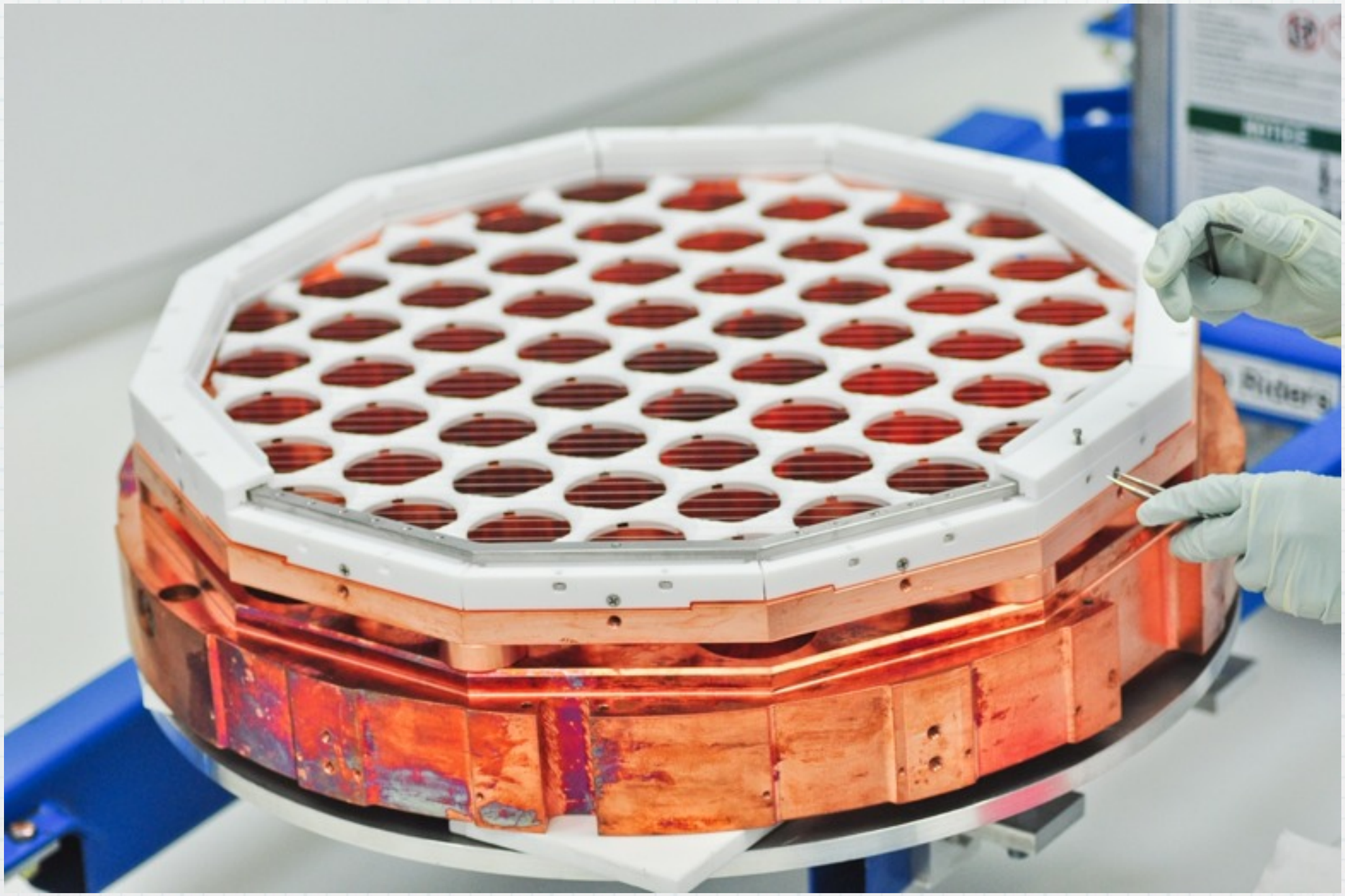
Grids - upgraded and reinstalled



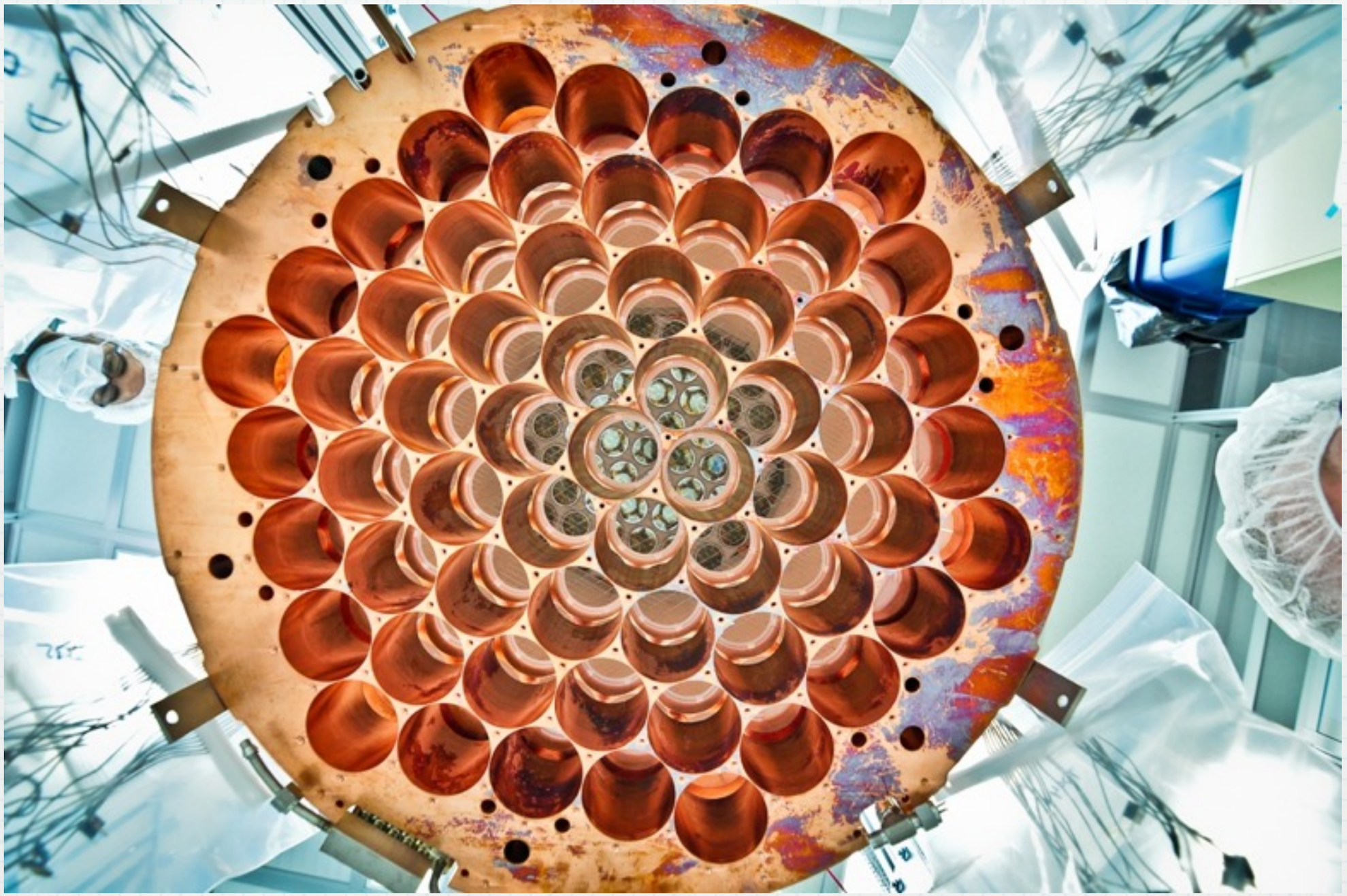
Grids - upgraded and reinstalled



Grids - upgraded and reinstalled



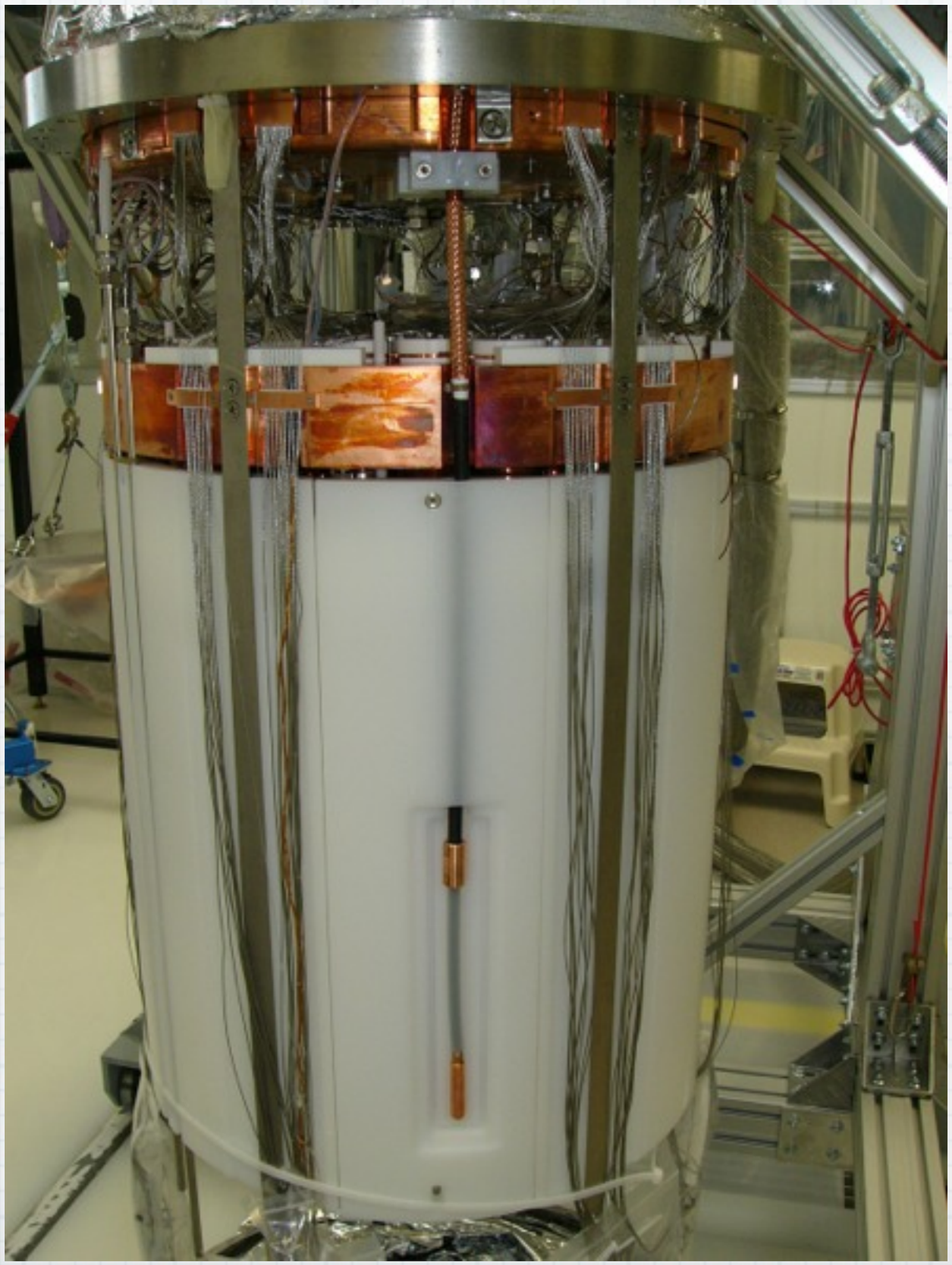
Grids - upgraded and reinstalled



Cathode High Voltage

* Most of run 02 at 4kV (of desired 100kV)
* Completely new feedthrough design and new cable
* Installation successful with no problems. Minor work remains.
* New feedthrough tested extensively at Yale
  * 80kV - 1 month
  * 100kV - 1 week

Cathode High Voltage

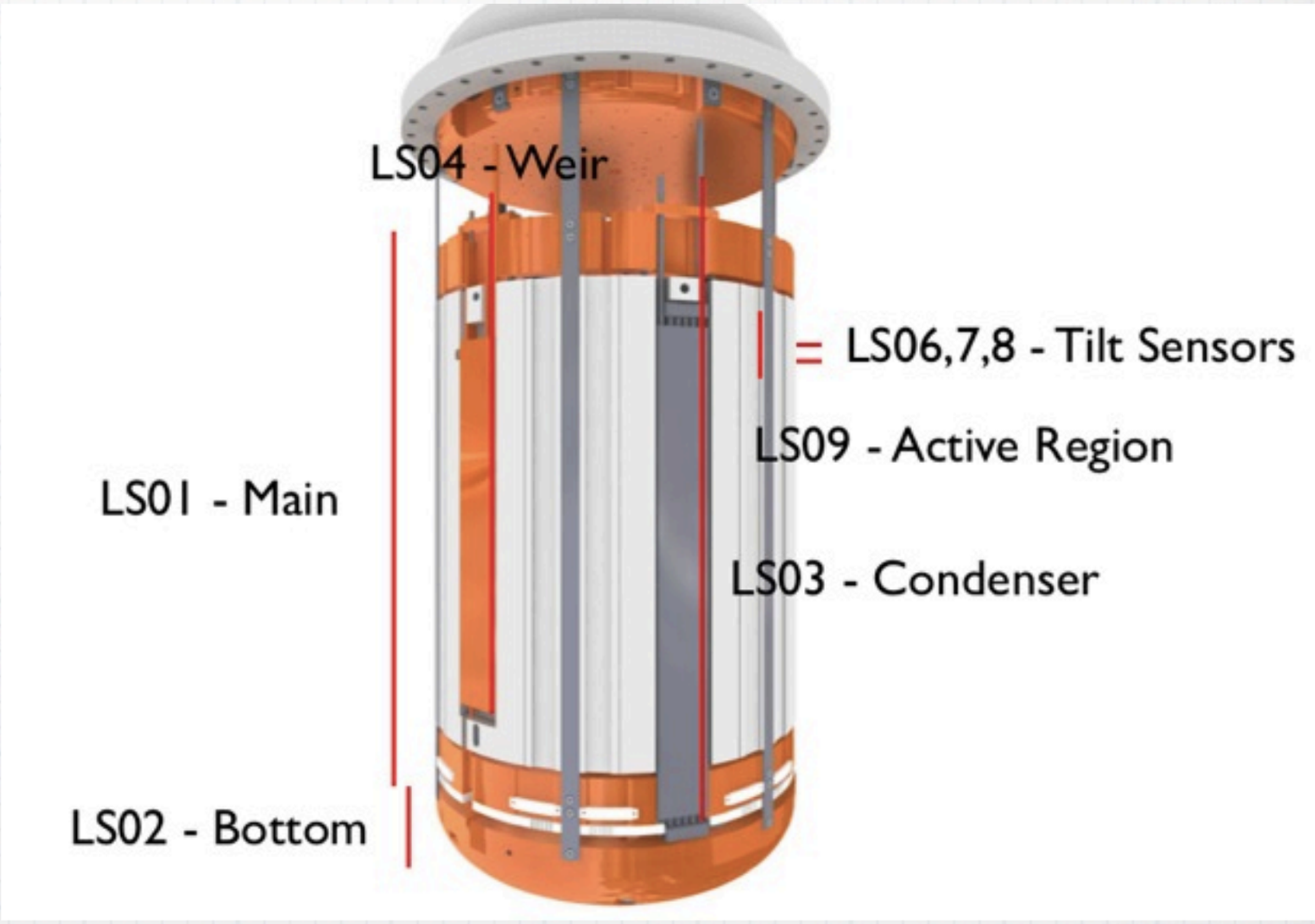


Cathode High Voltage

Cathode High Voltage

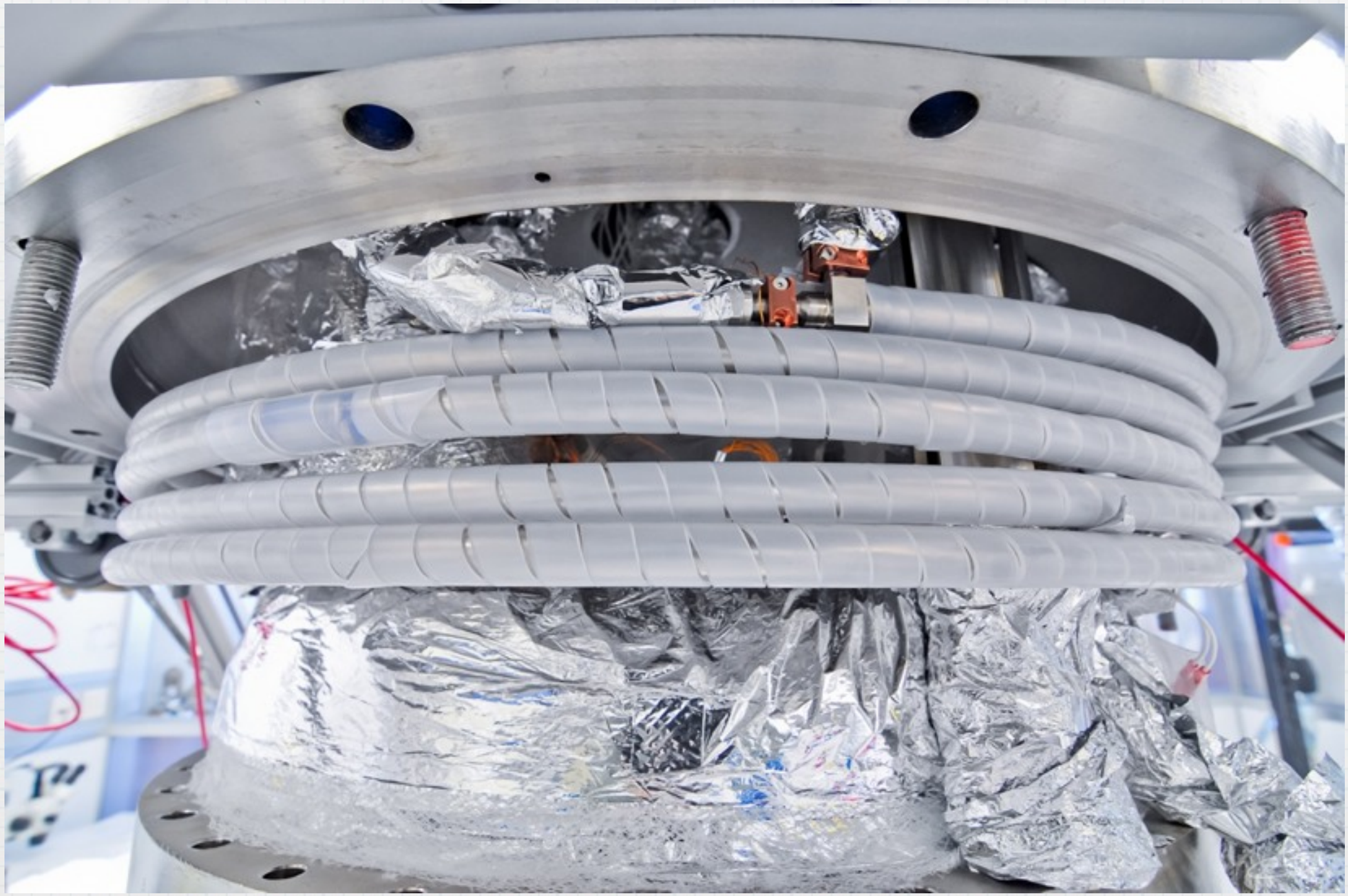
Internal Circulation

* Broken HX2 plumbing and HX1 impedance
* Complete redesign and replacement of HX1
* HX2 problem found, fixed
* Level sensors LS01 and LS04 fixed



Internal Circulation

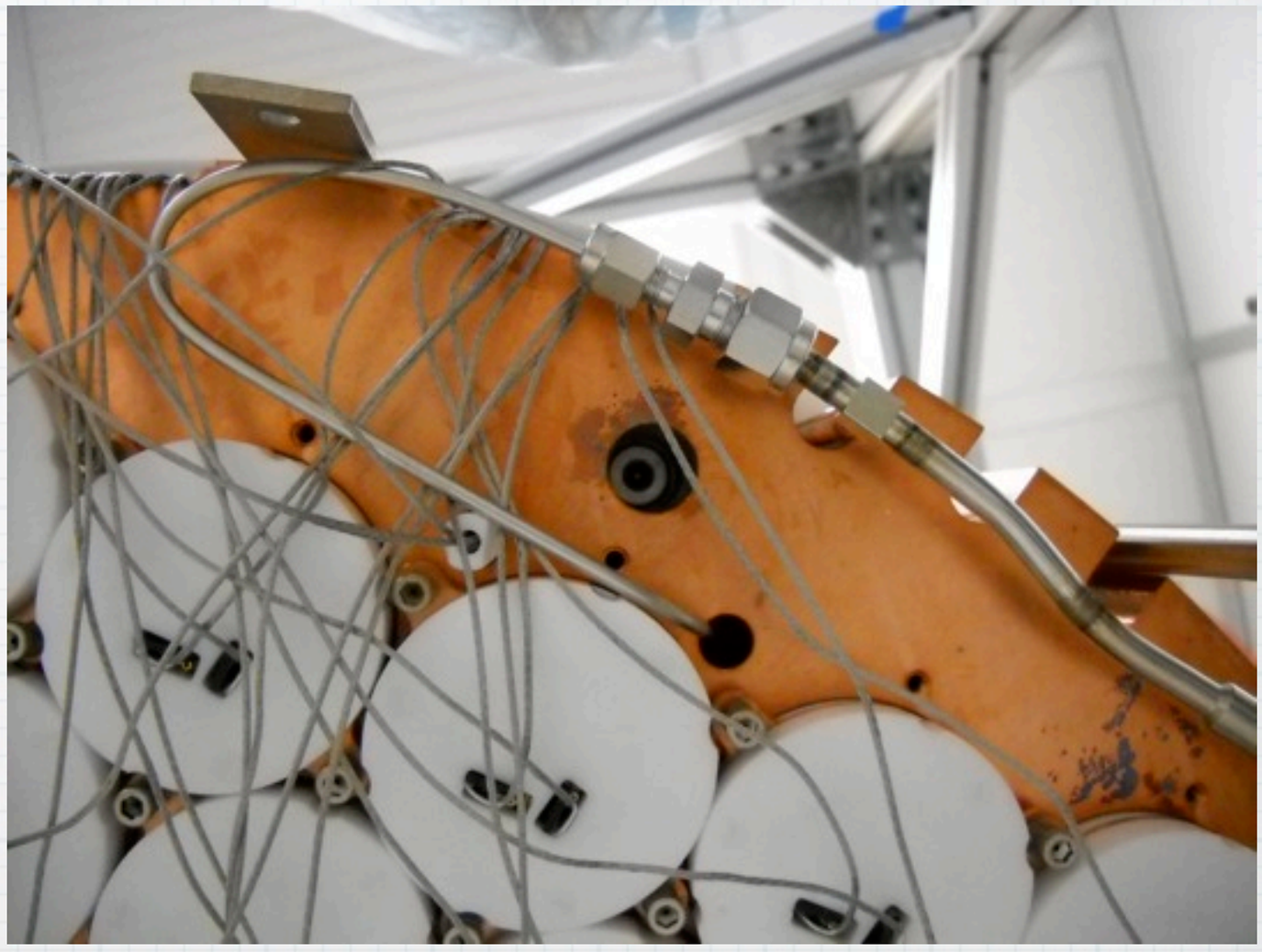
Internal Circulation



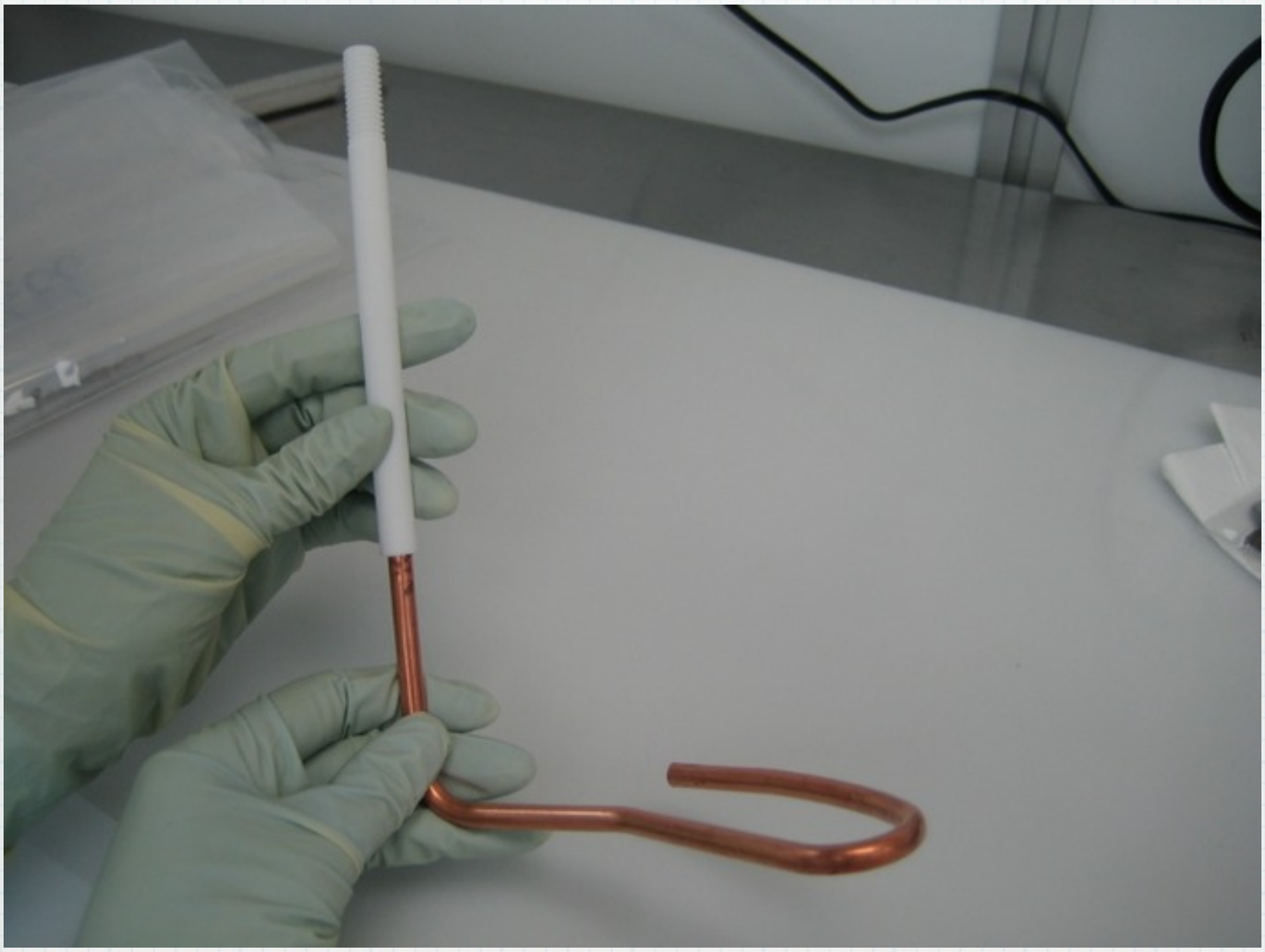
Internal Circulation

Liquid Return Line

* Kludge was "used" in Run 02
* New Liquid return line fabbed by TAMU
* Install next week



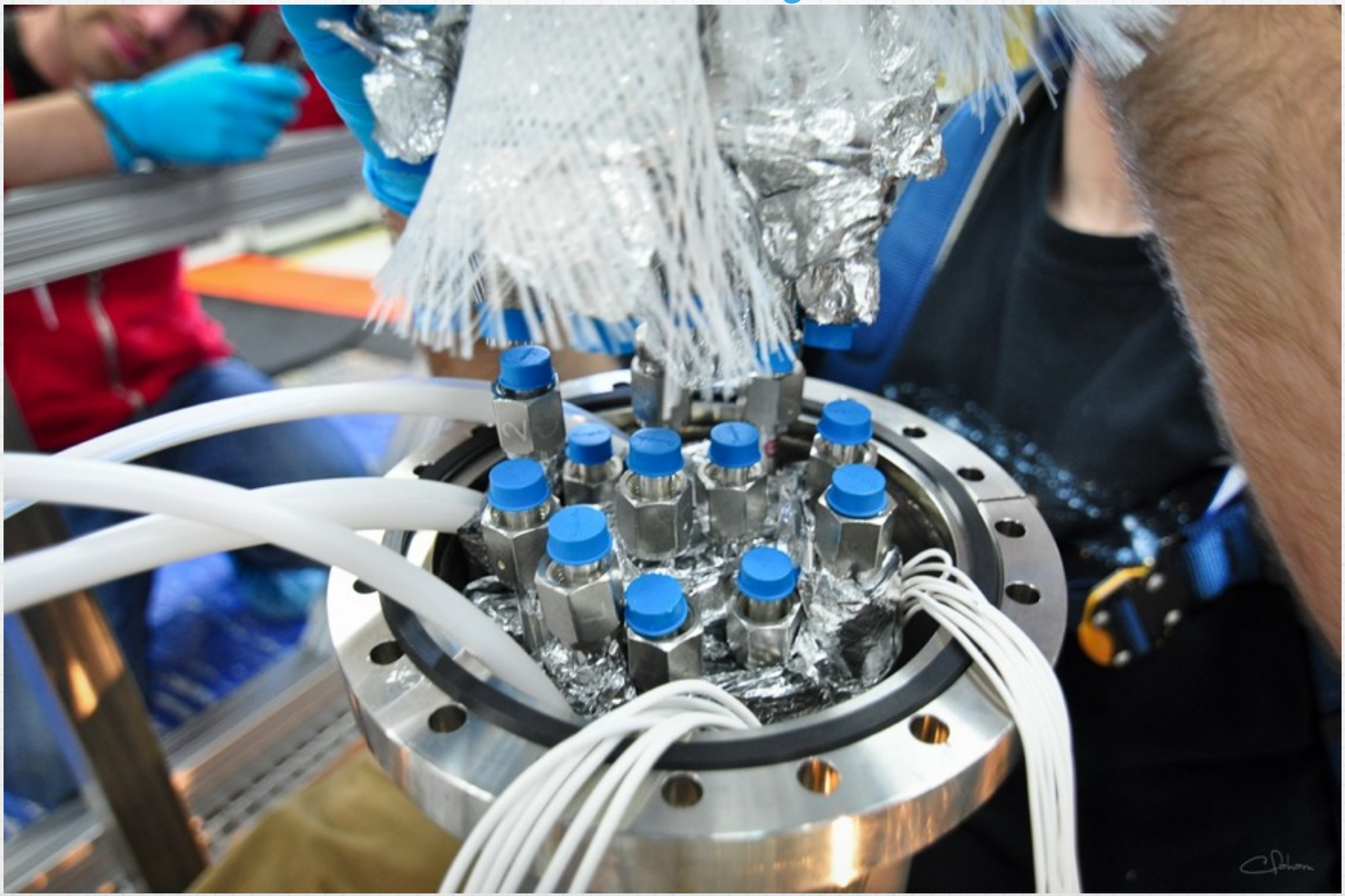
Liquid Return Line



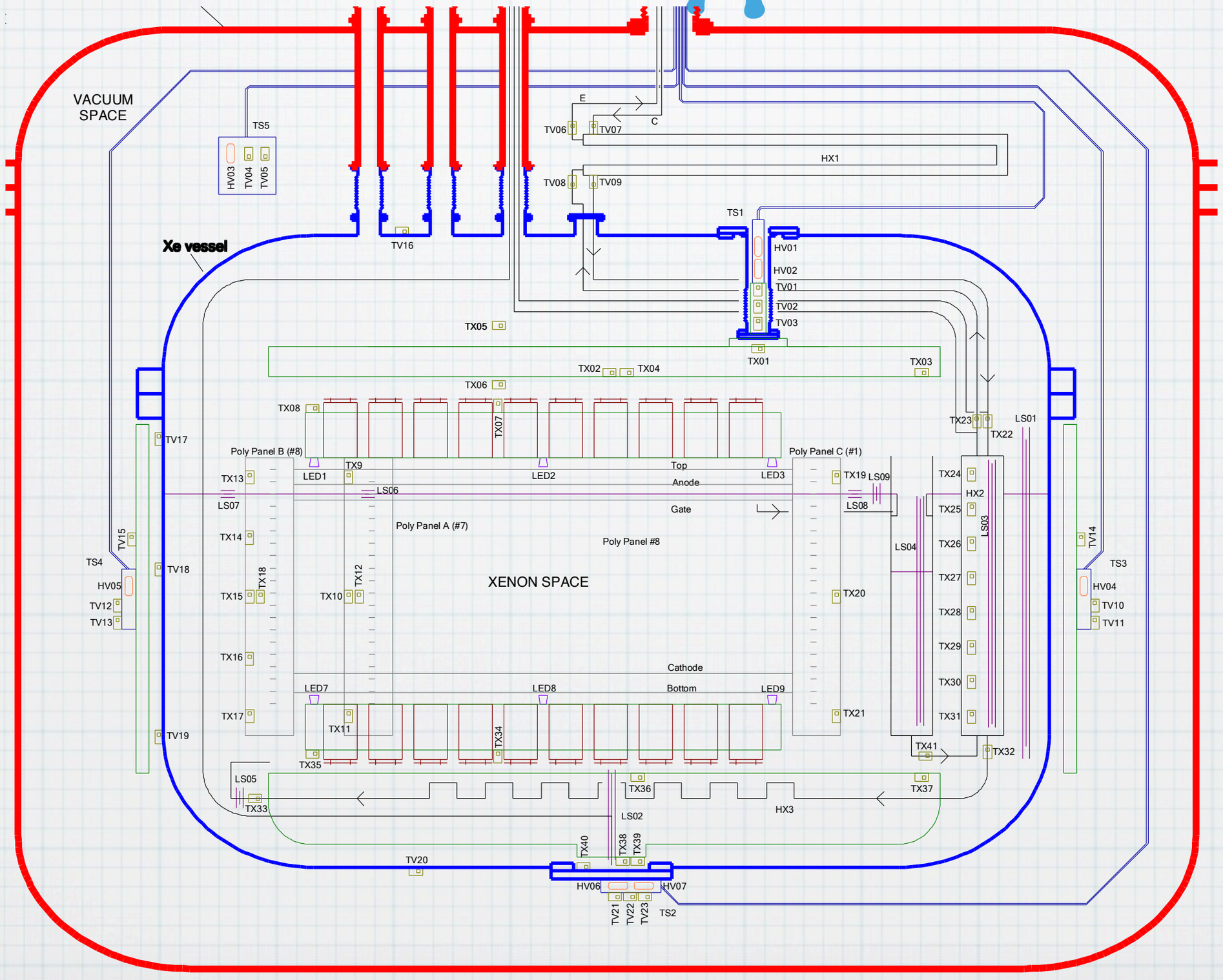
Thermosyphons

* Successful delivery of cooling power
* High power and low power modes
* Installation improvements

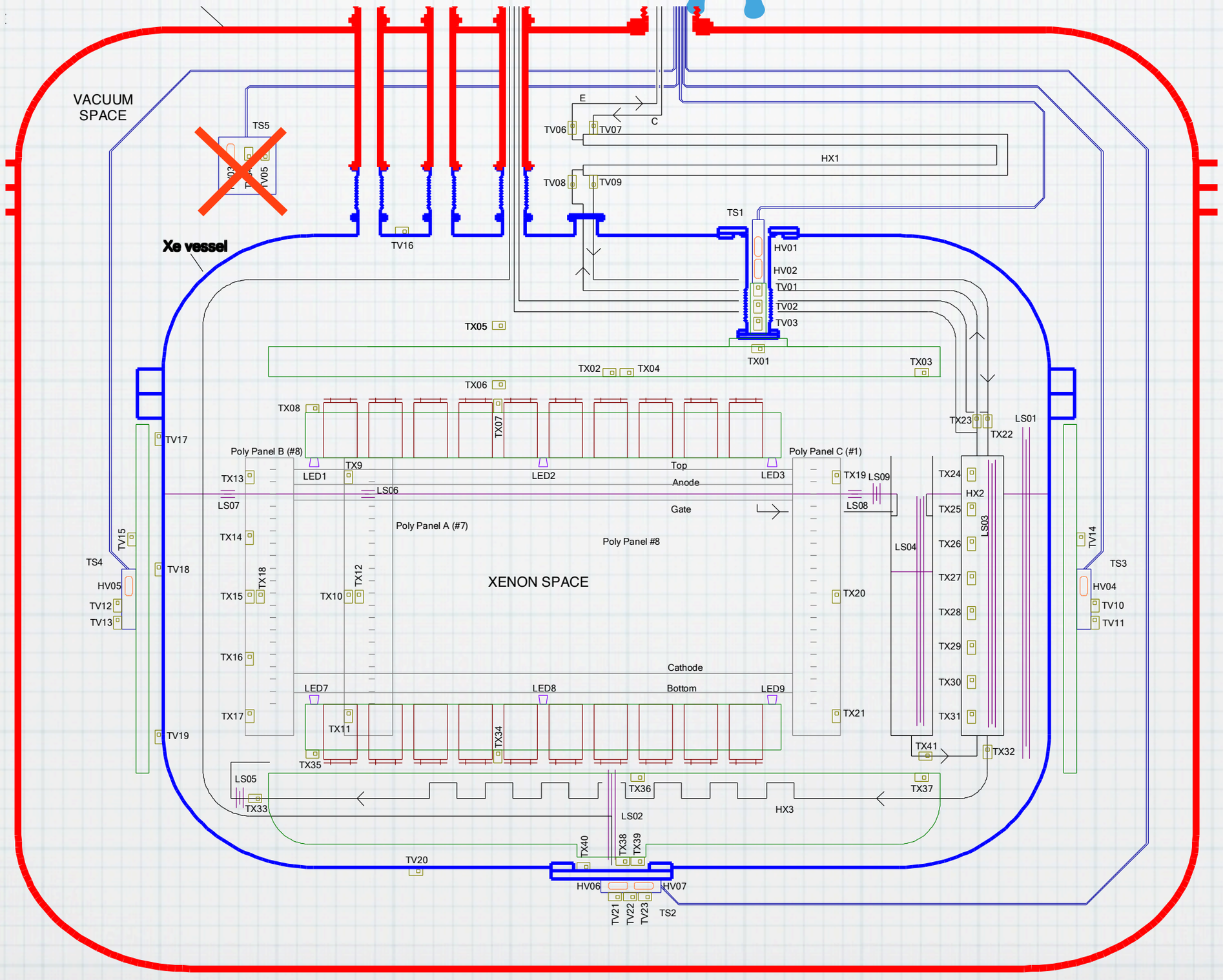
Thermosyphons



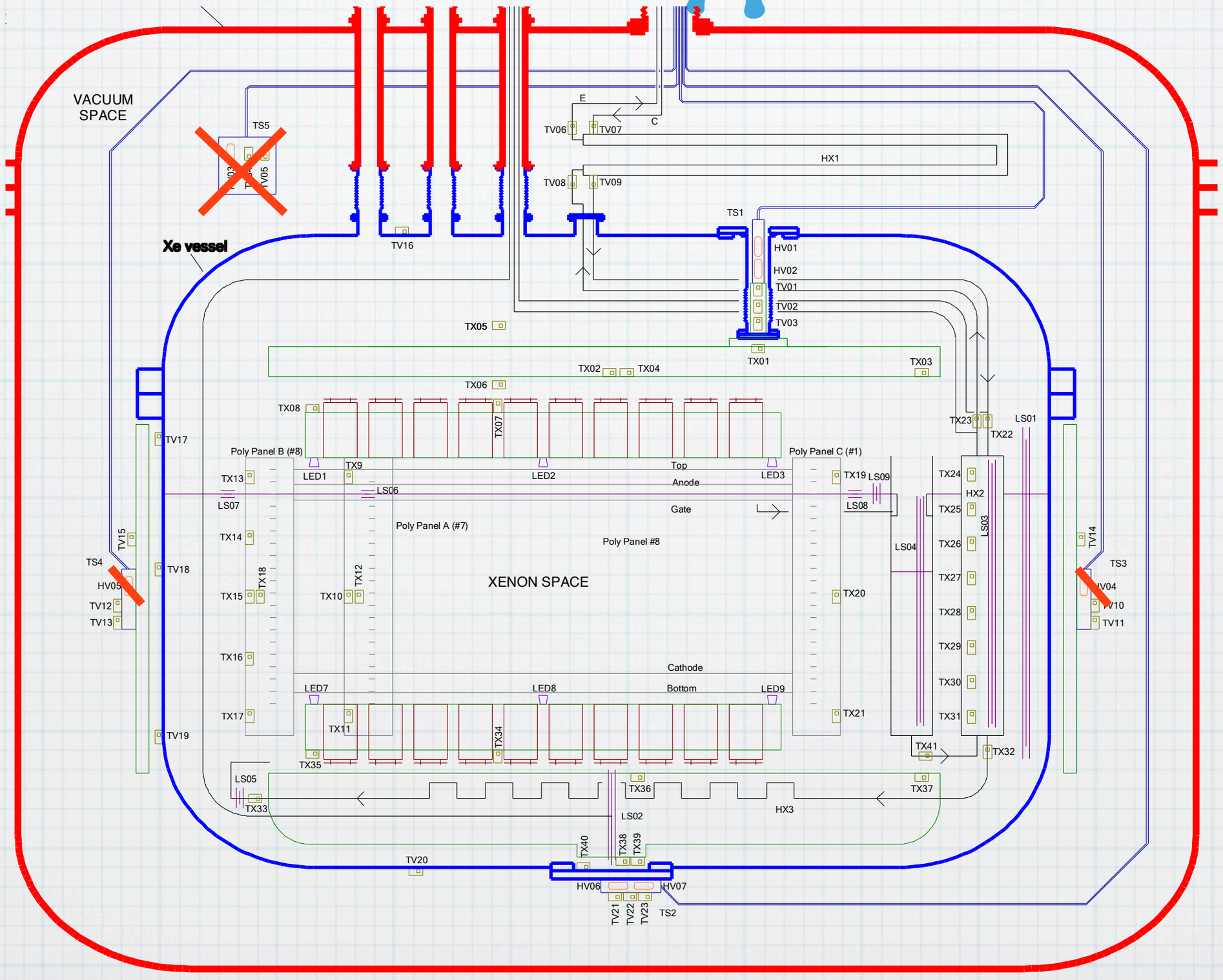
Thermosyphons



Thermosyphons



Thermosyphons



Thermosyphons

We're almost there

* Internal plumbing finished next week
* Final checkouts then FCS and inner can
* OV finished in late June/early July
* Underground Transport