Cubism - Braque’s Bottle and Fishes, Paris c.1910-12

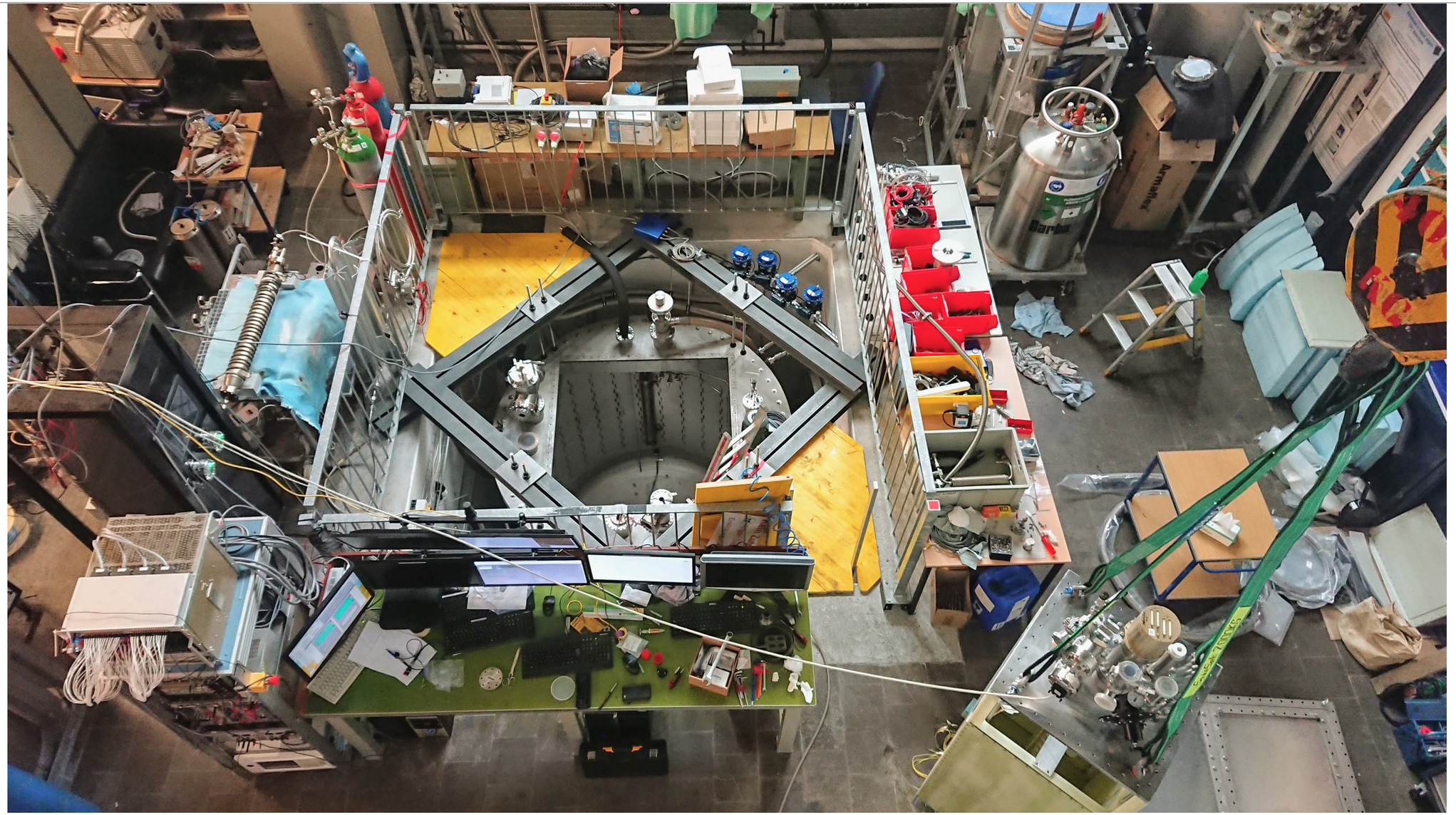
ArgonCube 2x2 Infrastructure Test Status

DEEP UNDERGROUND NEUTRINO EXPERIMENT

ND Biweekly
Aug 21st 2019

James Sinclair, LHEP

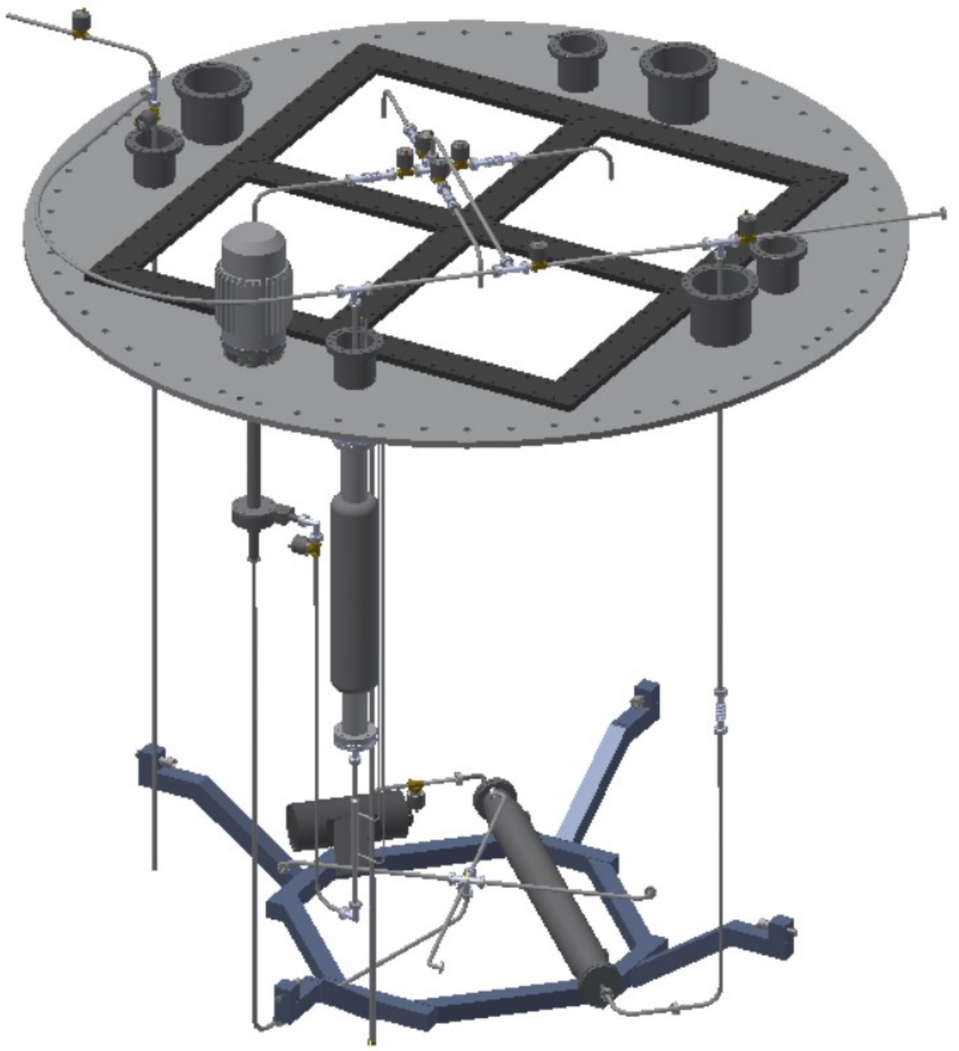
We are gearing up for another ArgonCube 2x2 test in Bern



The purpose of this test

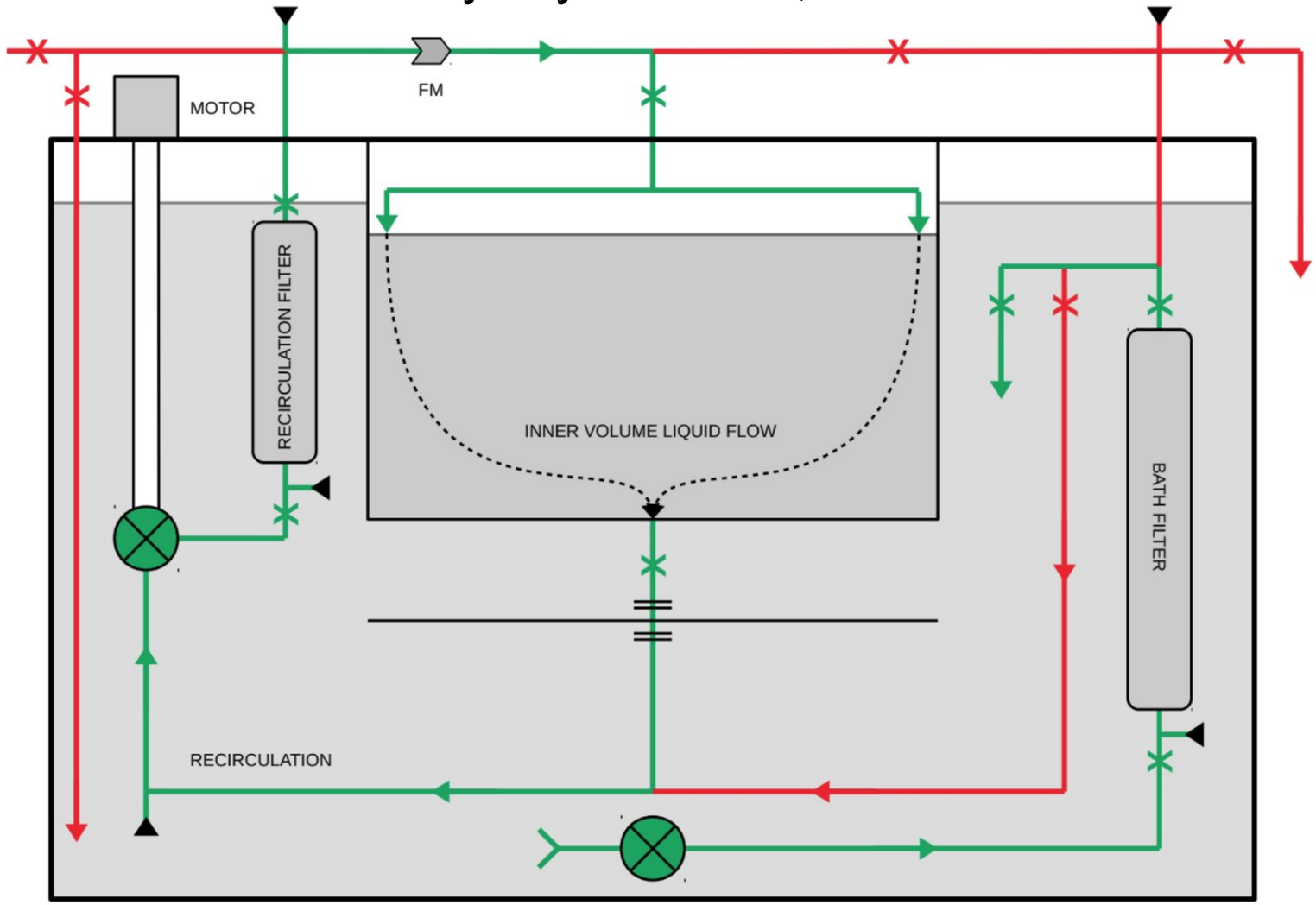
Fermilab has to review the cryo-system of 2x2, therefore its design must be finalised and demonstrated asap.

We must also have the cryostat ready for module deployment, before we can divert resources to module construction.

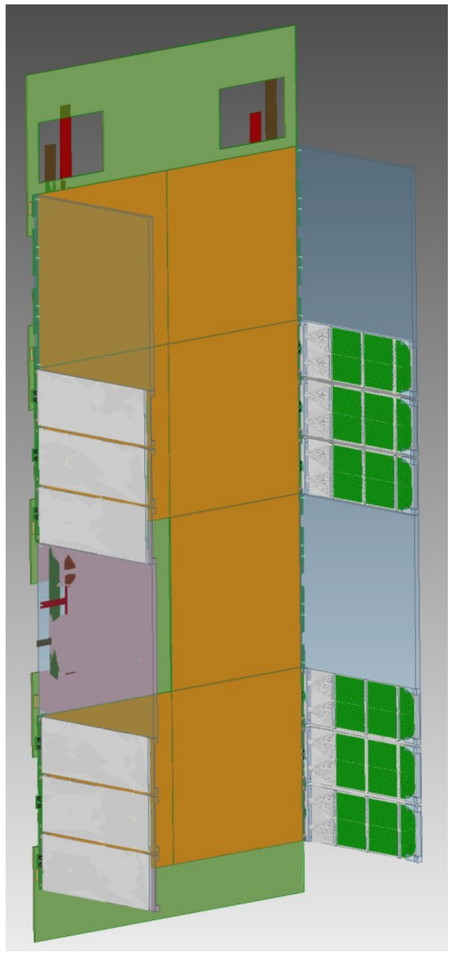


The 2x2 Cryogenic Scheme

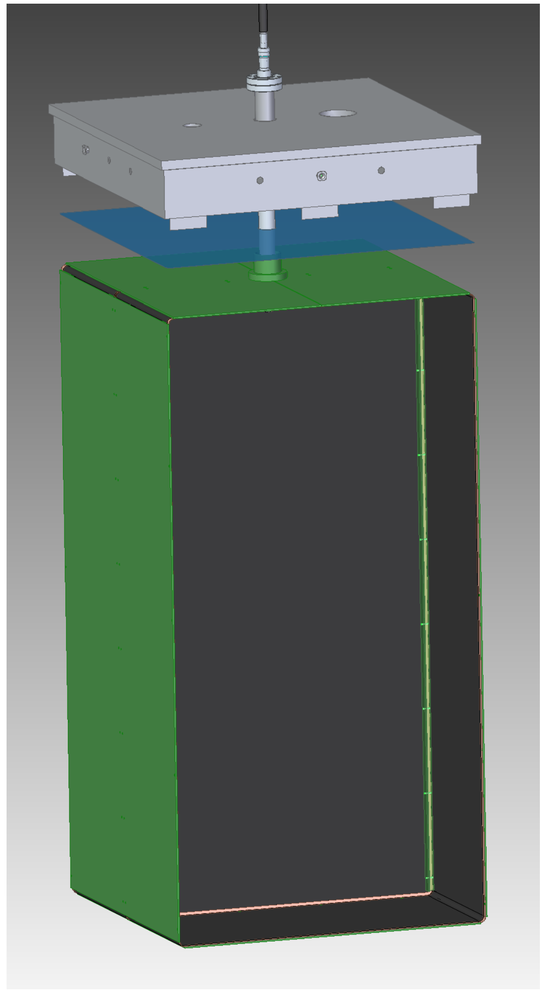
We are working toward the full 2x2 cryo system. But, this relies on Knut's module



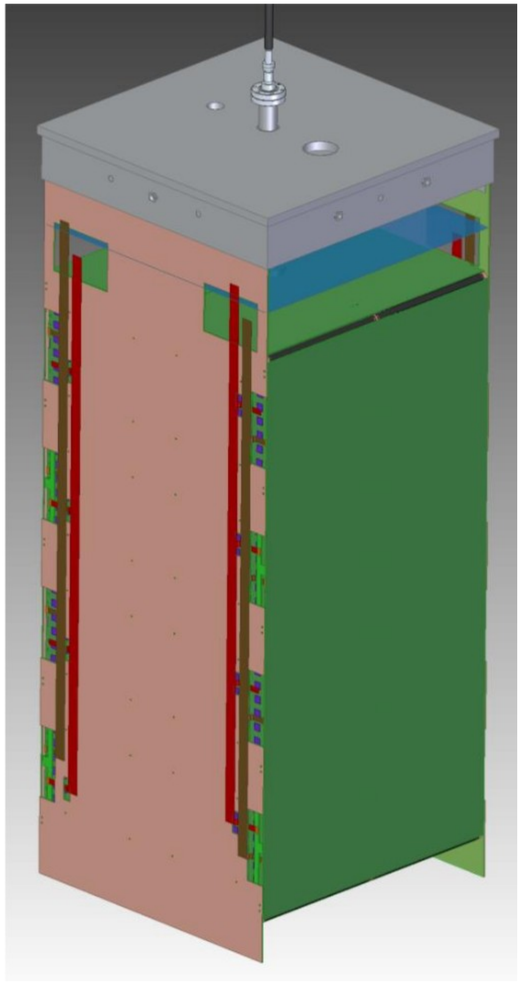
Knut’s Module Design



Light &Charge R/O, half detector

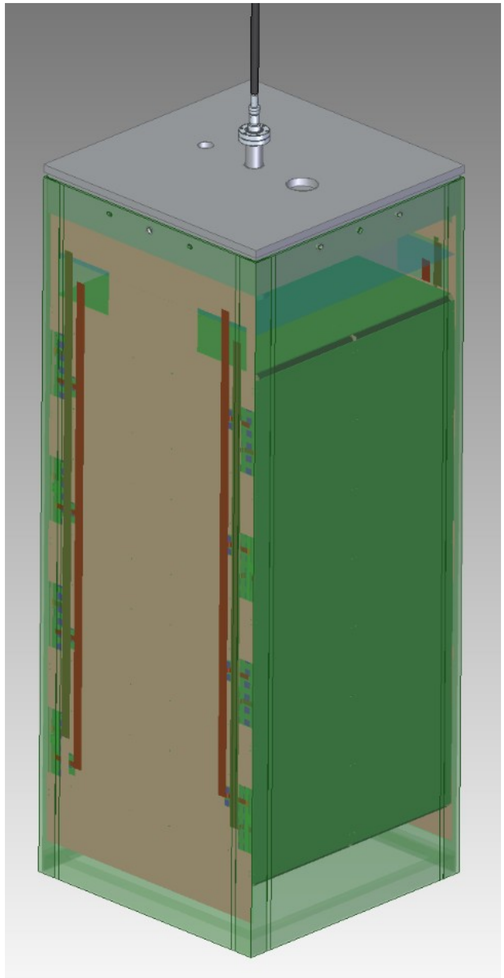


Resistive shell TPC



Naked detector

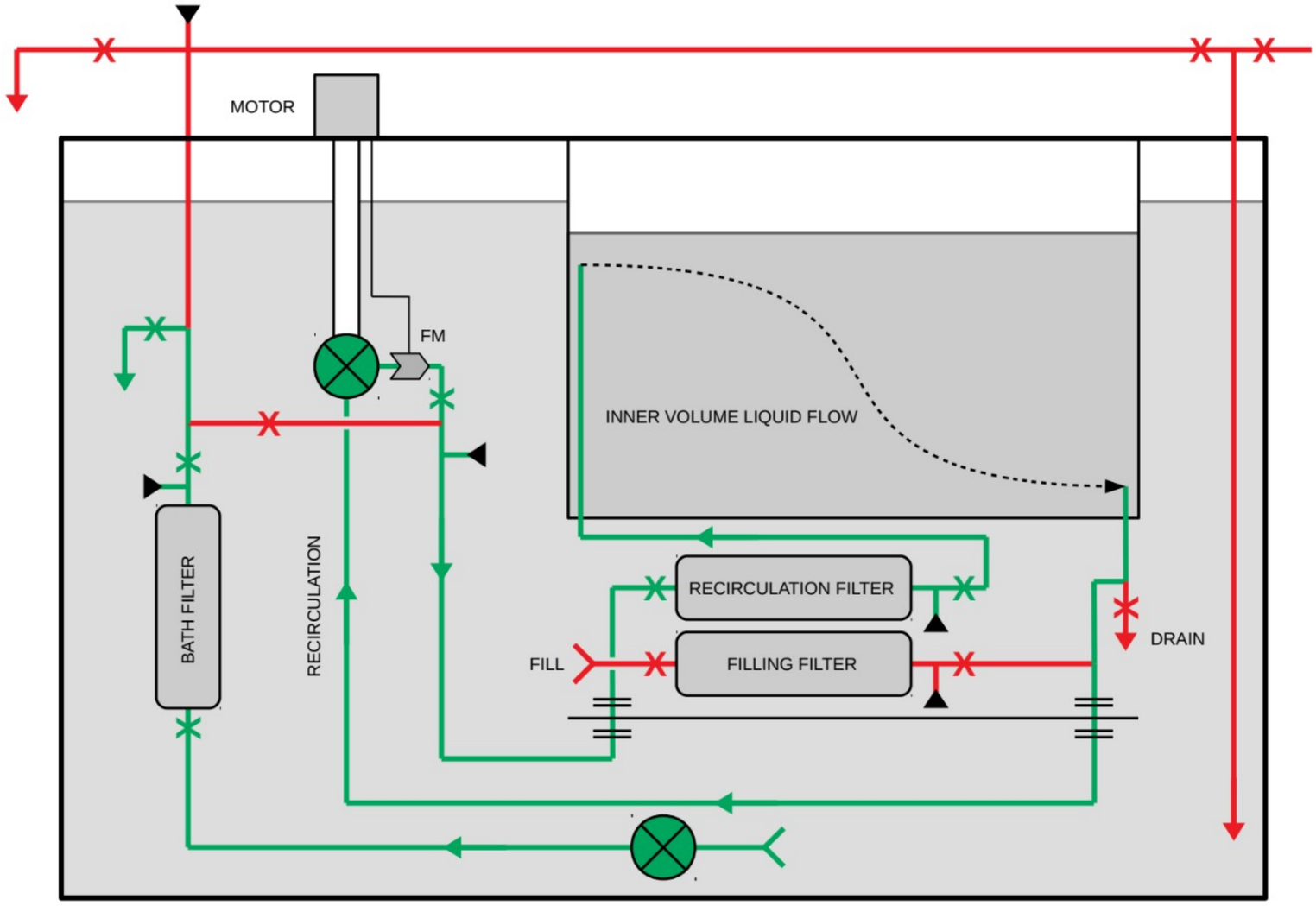
Module bucket



Module

Current test Scheme

As we do not have the new modules, we need to work with what is in hand.



Test items

Cryogenic control valves (custom solenoid valves to replace check valves).

Module pump (top-flange mounted pump for module recirculation)*.

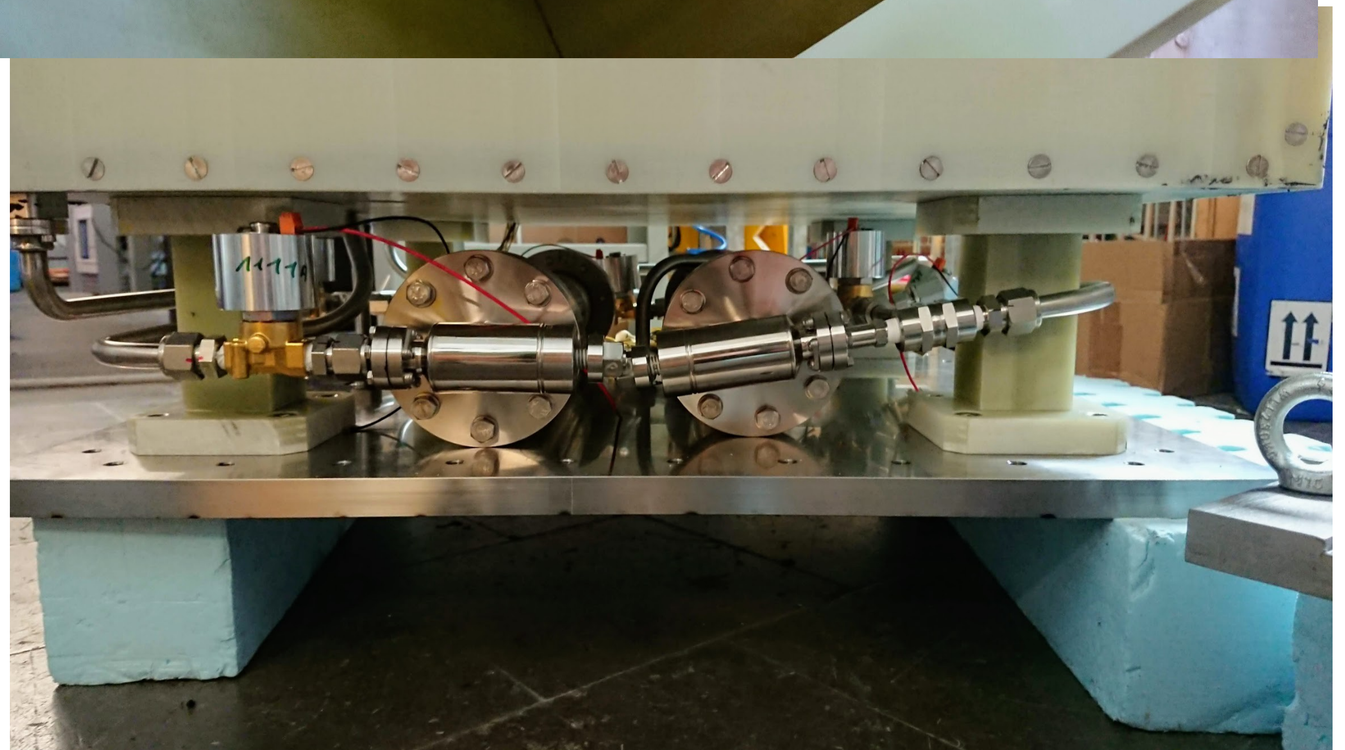
Sump pump (with continuous filtration of bath, refilling module with clean argon)*.

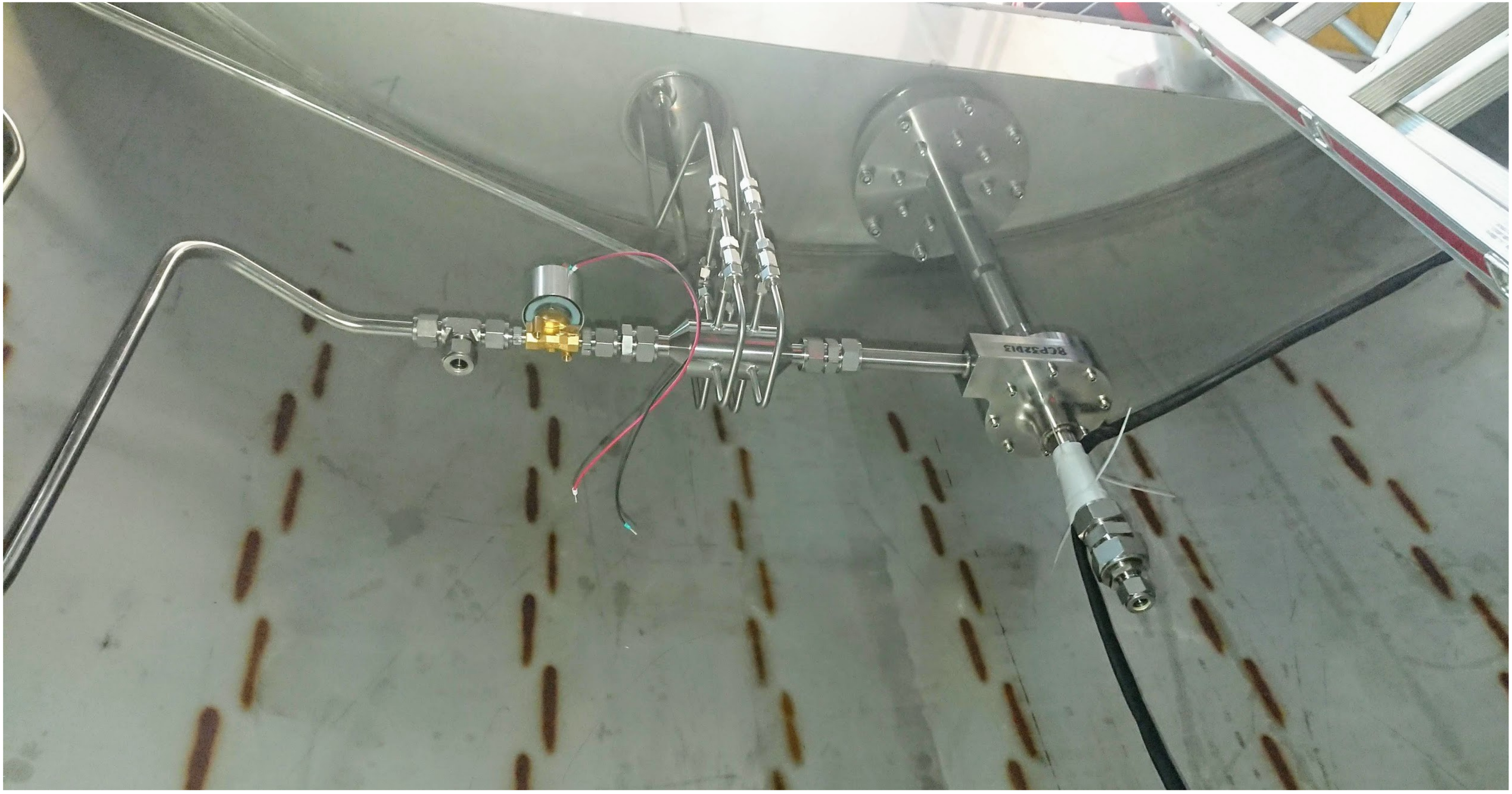
*VFD noise suppression for pumps

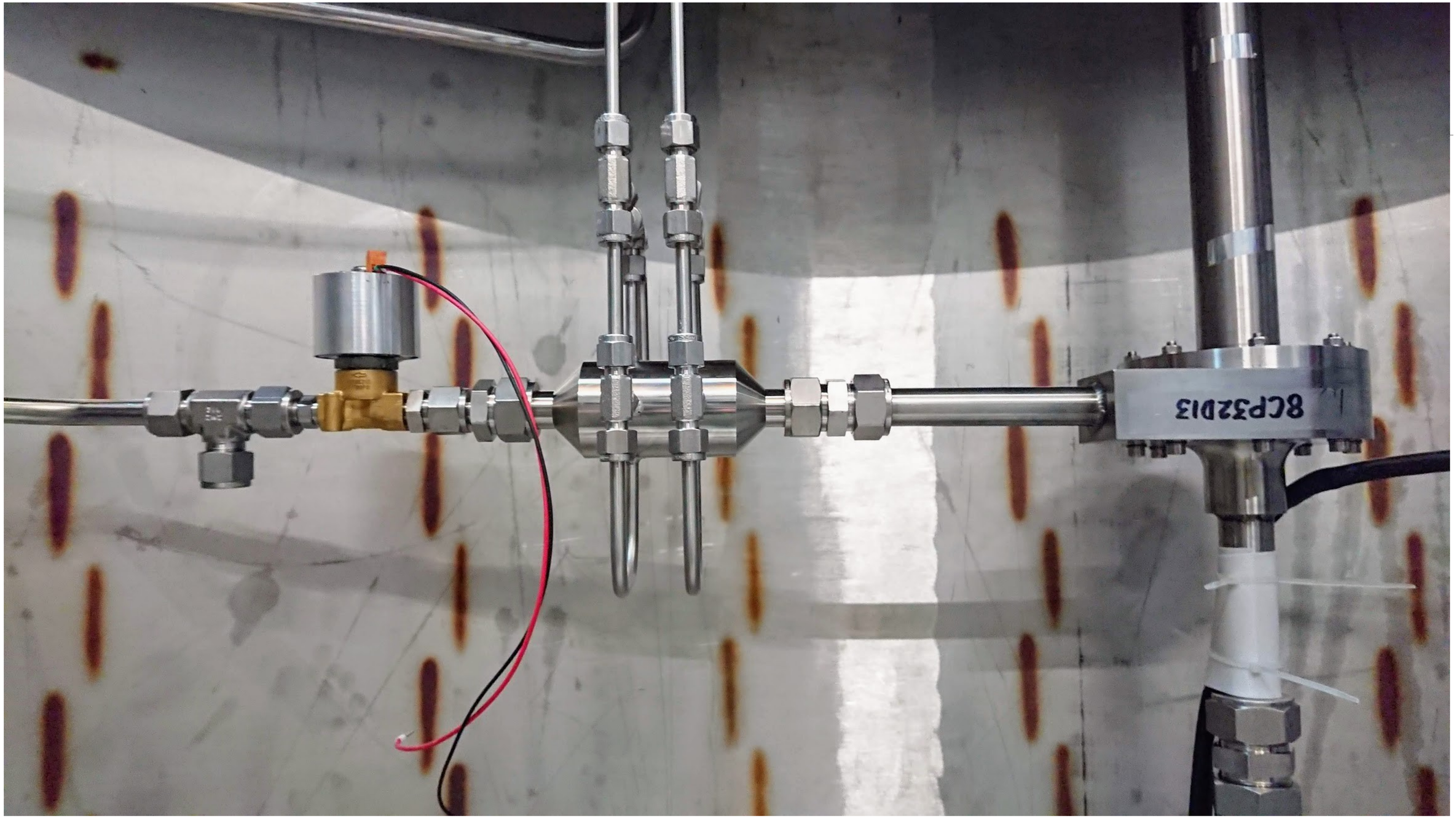
Fermilab PLC (simplify integration of 2x2 at Fermilab)

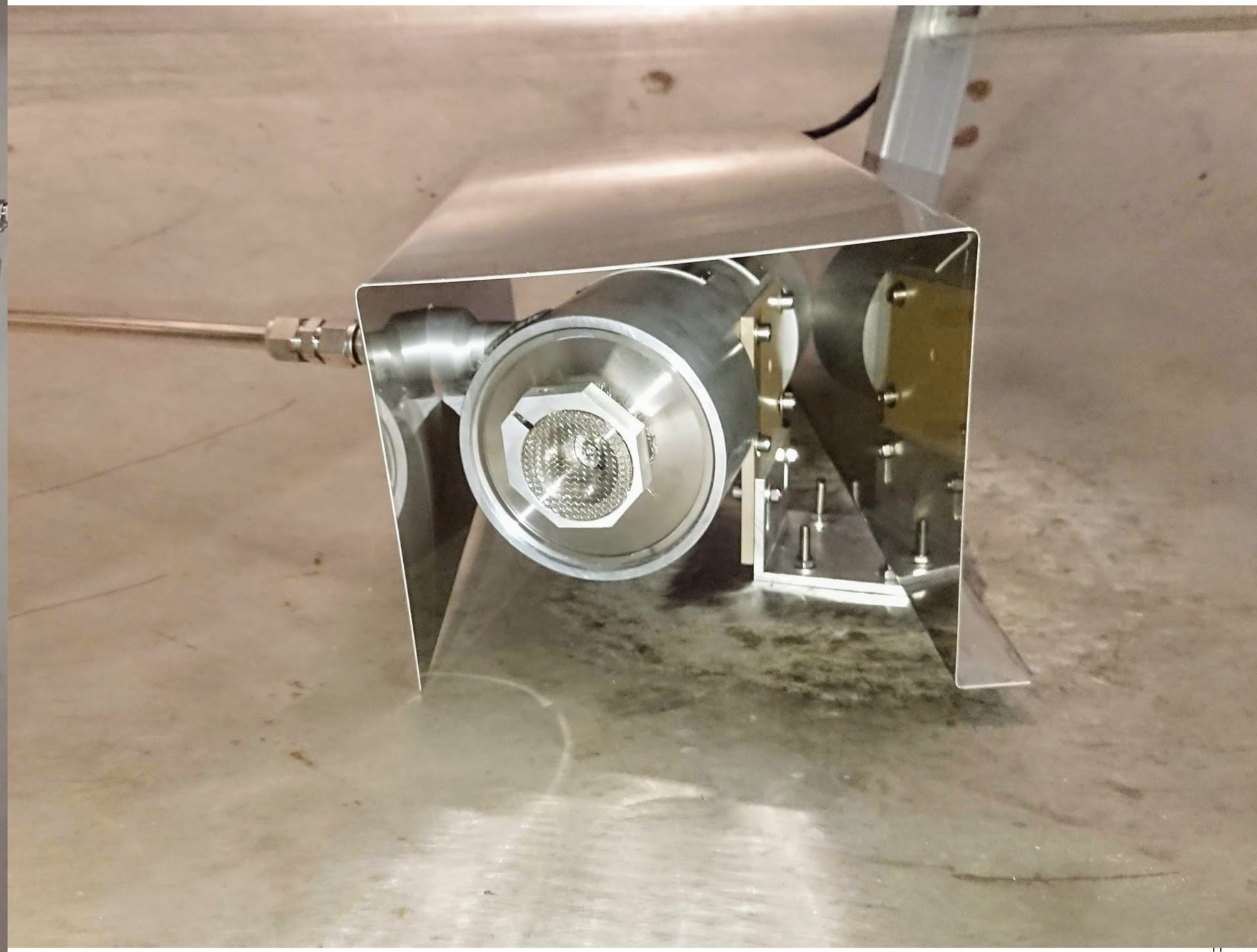
Fast gas repressurisation system (maintain 5 mbar between module & bath)

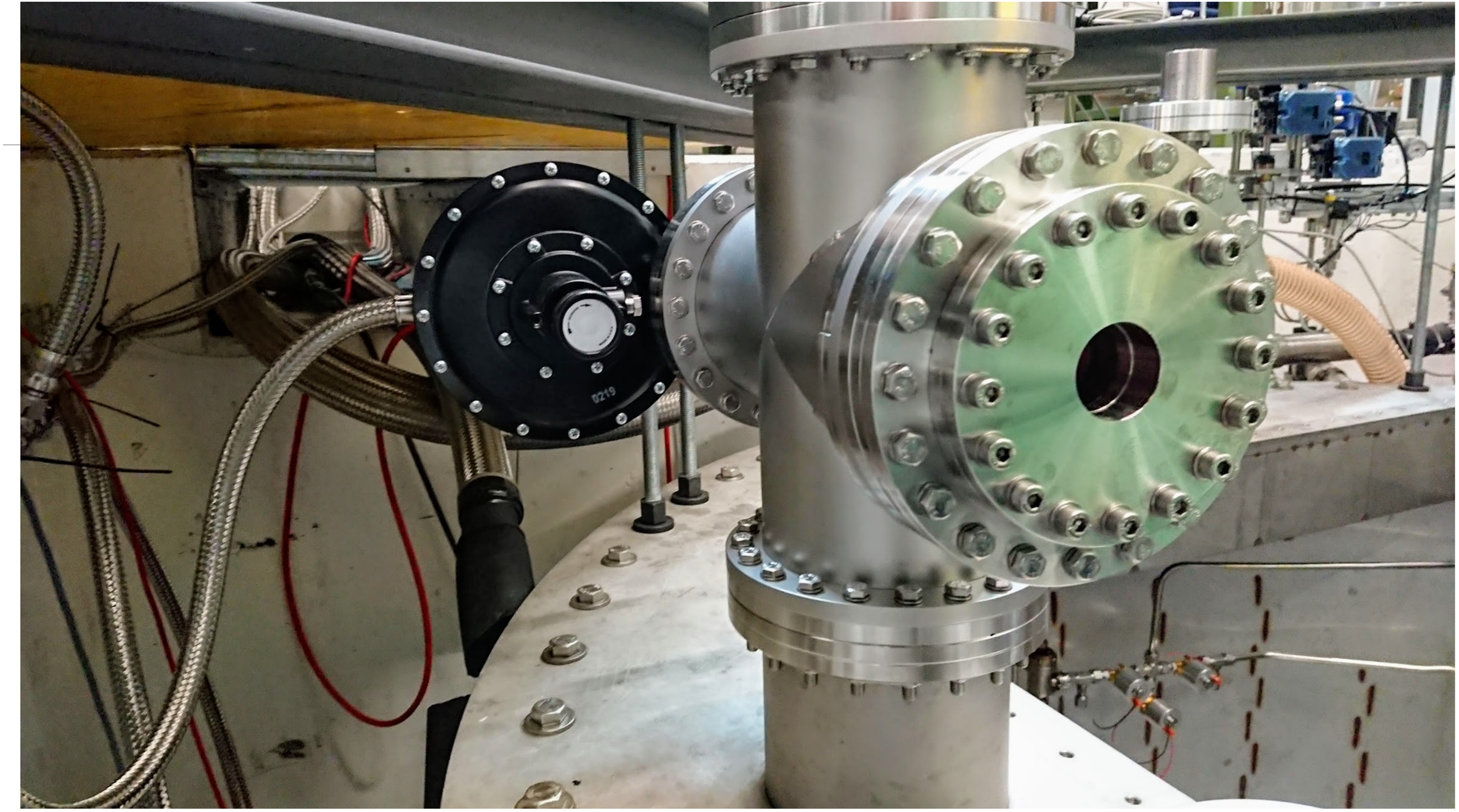
Filter design

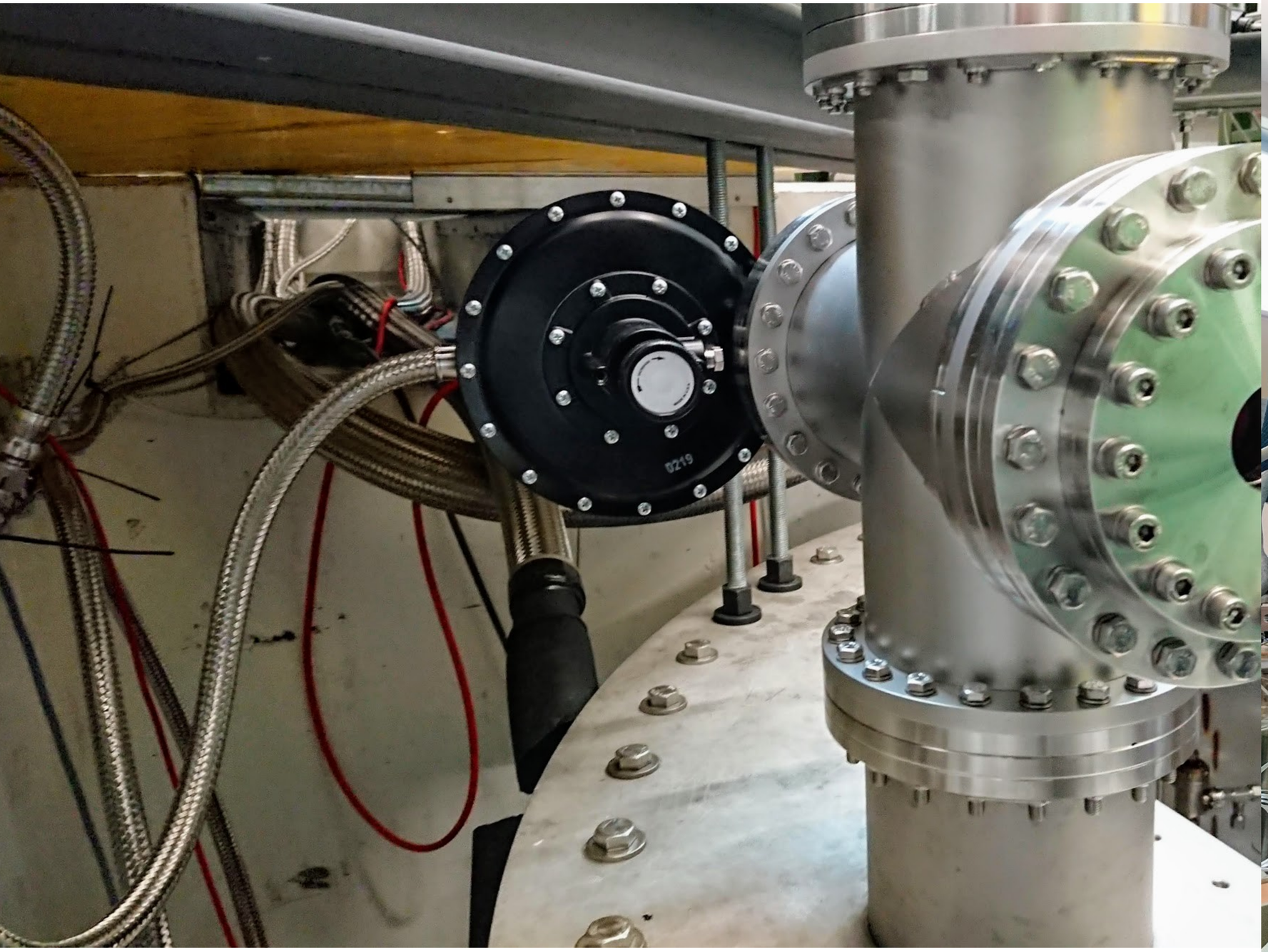


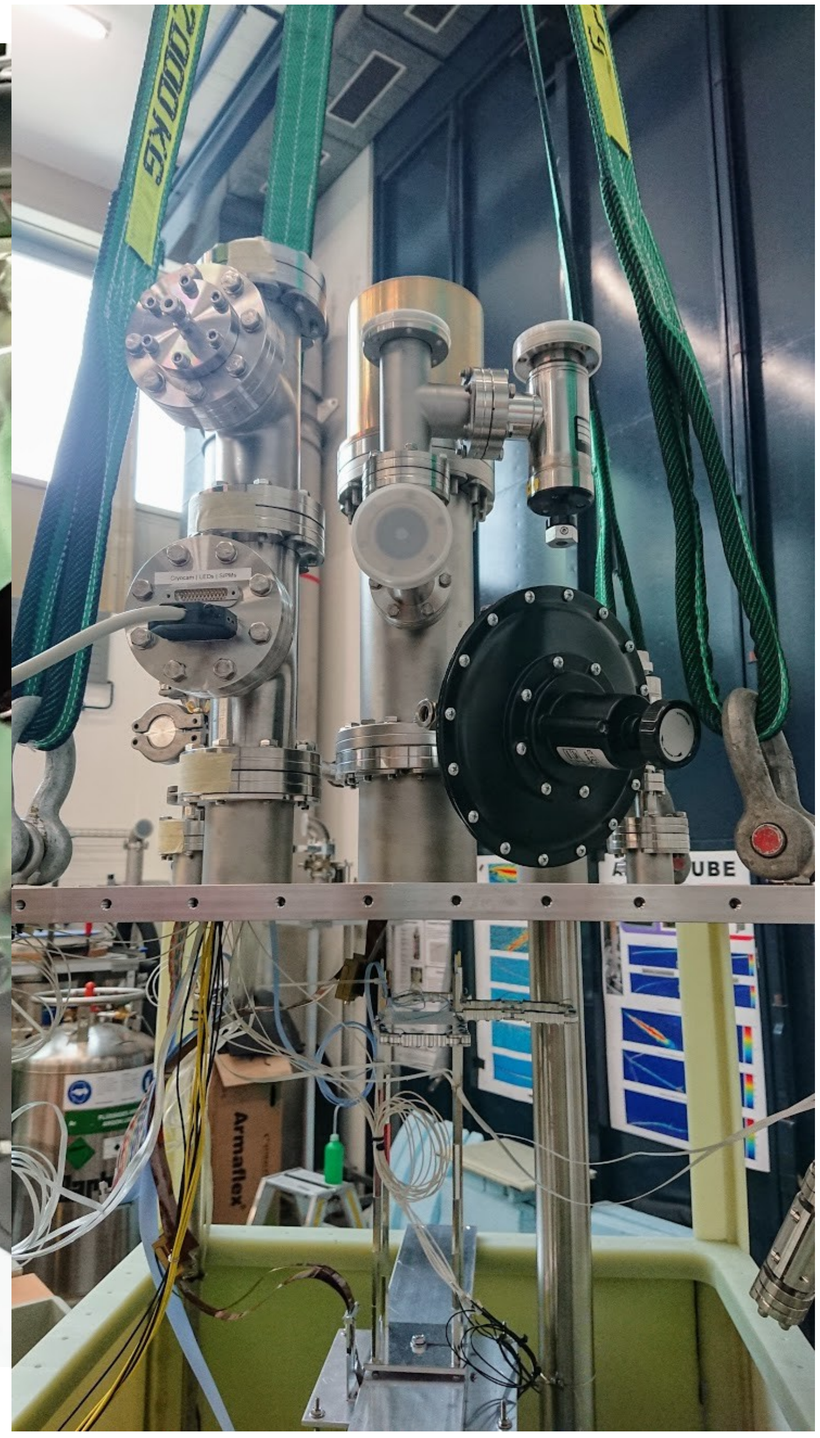

BCP32D13


8CP32D13





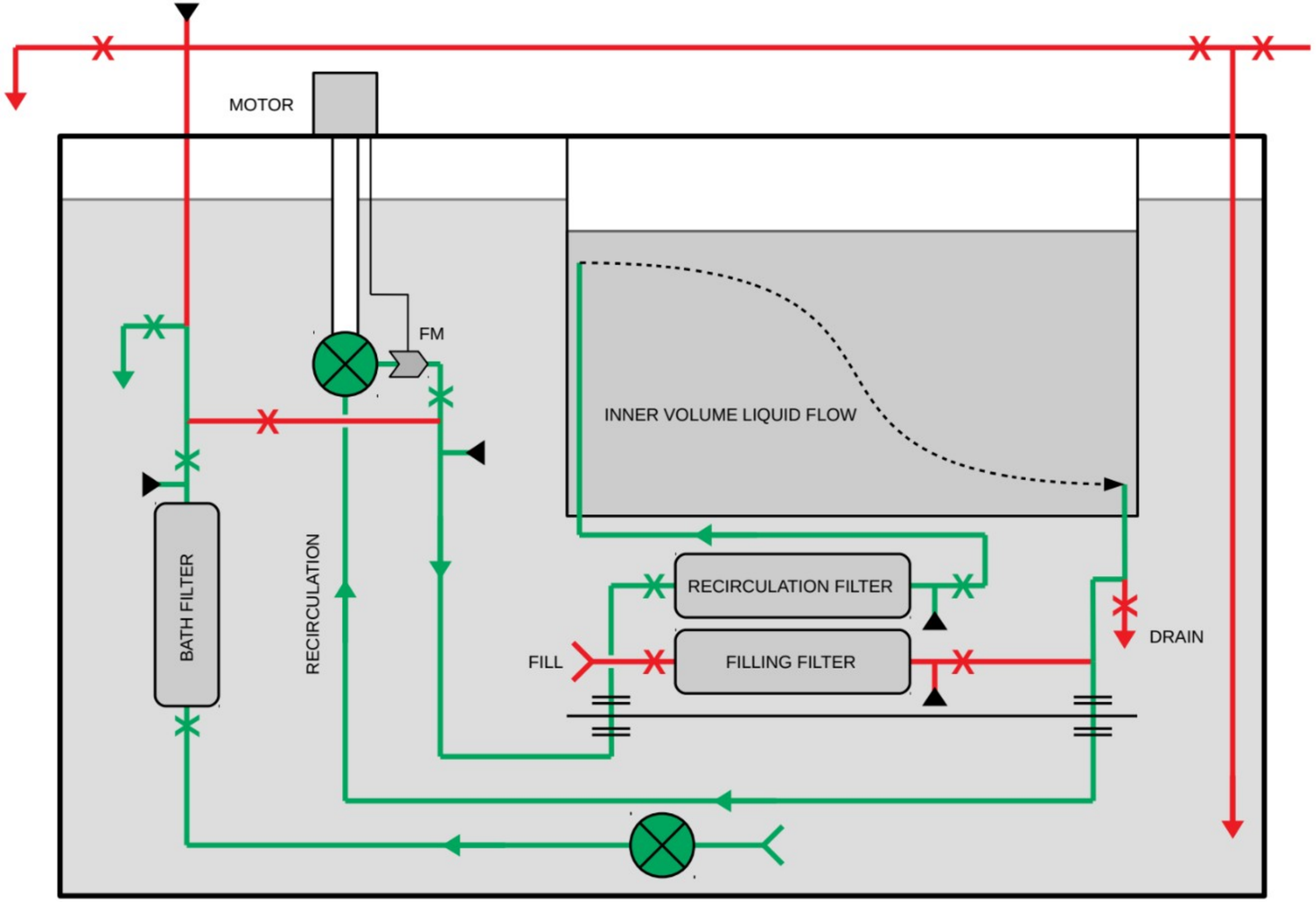





Armaflex

Safety Consideration

All lines that can be sealed with the control valves form a pressure vessel and require a relief valve.



Outlook

Friday:
Safety valves will be installed, construction is completed. The vessel can then be cleaned.

Monday:
Vessel is sealed. Dry test of entire system. Filling begins.

Tuesday:
Second delivery of argon, filling completed.

Wednesday:
Stabilisation of system, and LAr purification.

Thursday:
Charge-lifetime tests.


LHEP