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

2x2 Updates

DEEP UNDERGROUND NEUTRINO EXPERIMENT

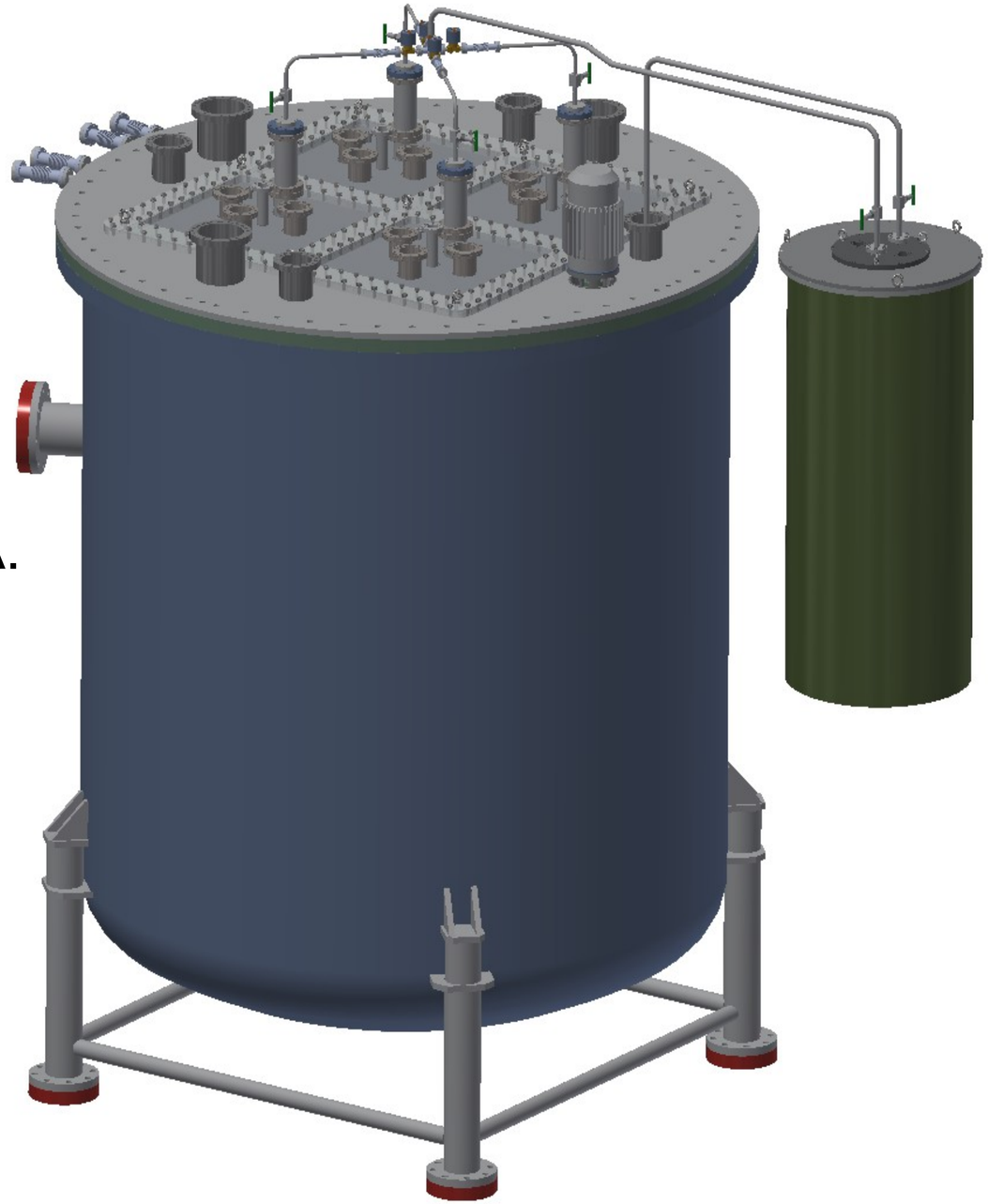
Cryo meeting
Feb 22nd 2021
James Sinclair, LHEP

2x2 updates

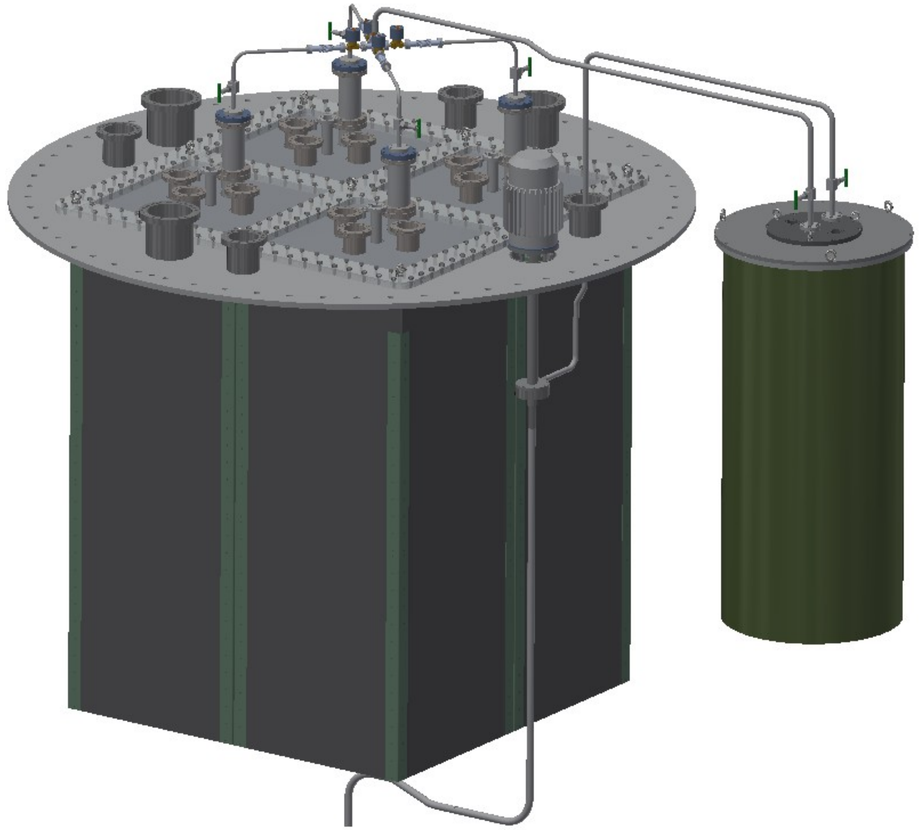
Design updates:
Preliminary FEA shown vacuum pockets will fail pressure test.
Fix has been designed, fabrication under way.
Module support frame still needs preliminary FEA.
Will send final geometry to FNAL after this

Delivery update:
Cryostat + top flange(s) will be ready to ship mid April. Arrival in FNAL ~ May/June.

Urgent questions:
Bern filter, or new filter?
What pump configuration?



Pump Options



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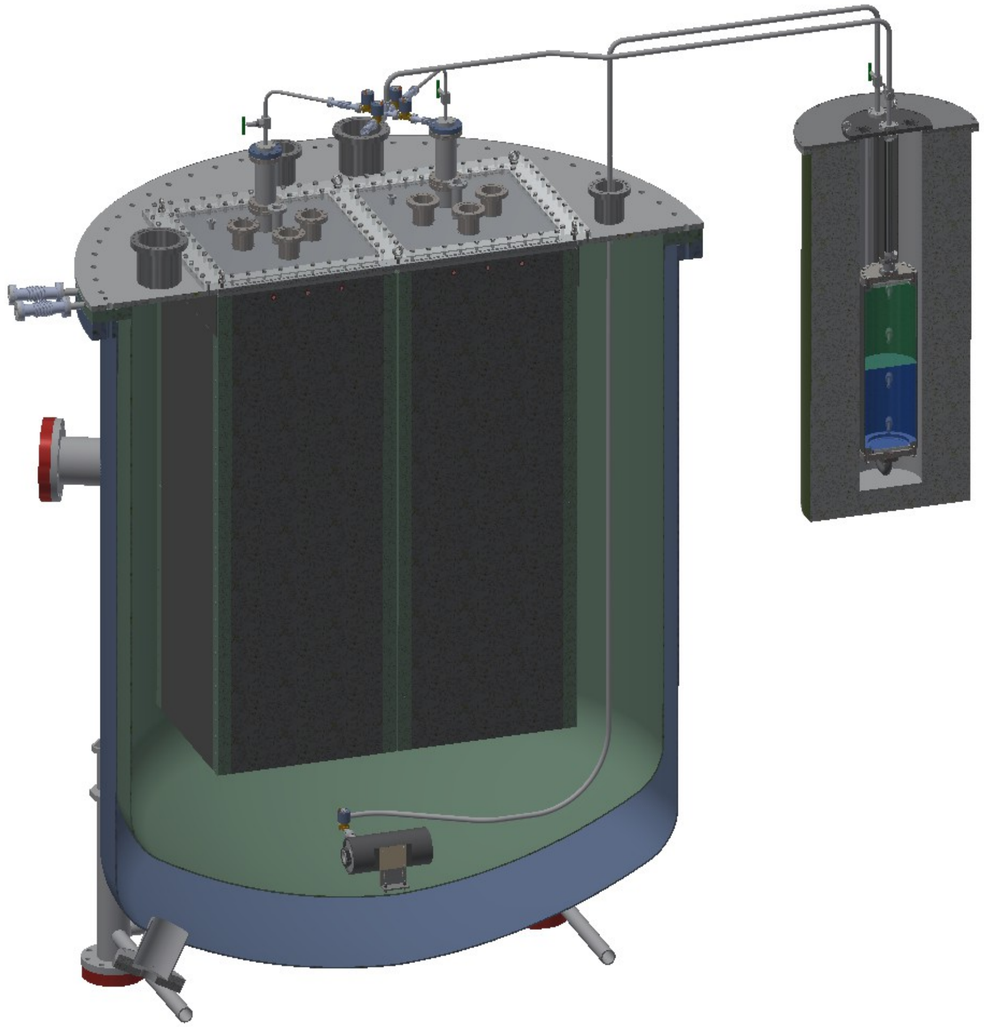


Pump Options

Sump-mounted pump:

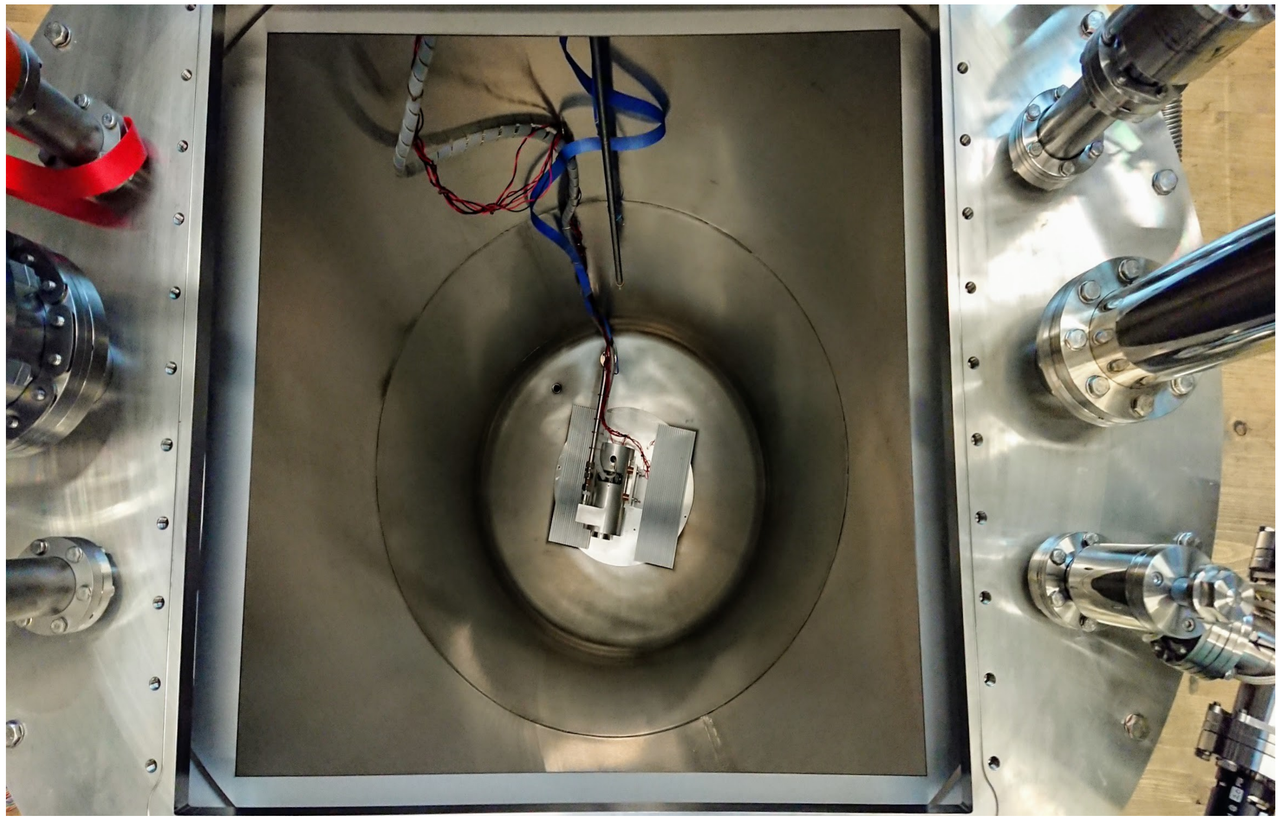
Feedthroughs:
Cables CF-63(4.5”)
Liquid outlet

Can be used to drain cryostat.

None serviceable motor or bearings.

Harder to electrically isolate, potentially a large noise source next to the detector.

We would have to order an additional pump in April (~20 week lead time).



Pump Options

Top flange-mounted pump:

Feedthroughs:
Impeller shaft CF-160(8”)
Liquid outlet

None serviceable motor or bearings as coupling is recessed.

Easier to electrically isolate (motor is outside).

Cannot operate when LAr is below impeller height (~350 mm)

FNAL (Barry) warns of issues of mechanical vibration

Note: this pump could be used in an external vessel fro the recirculation of a cryostat with a side penetration. Not possible in the 2x2.

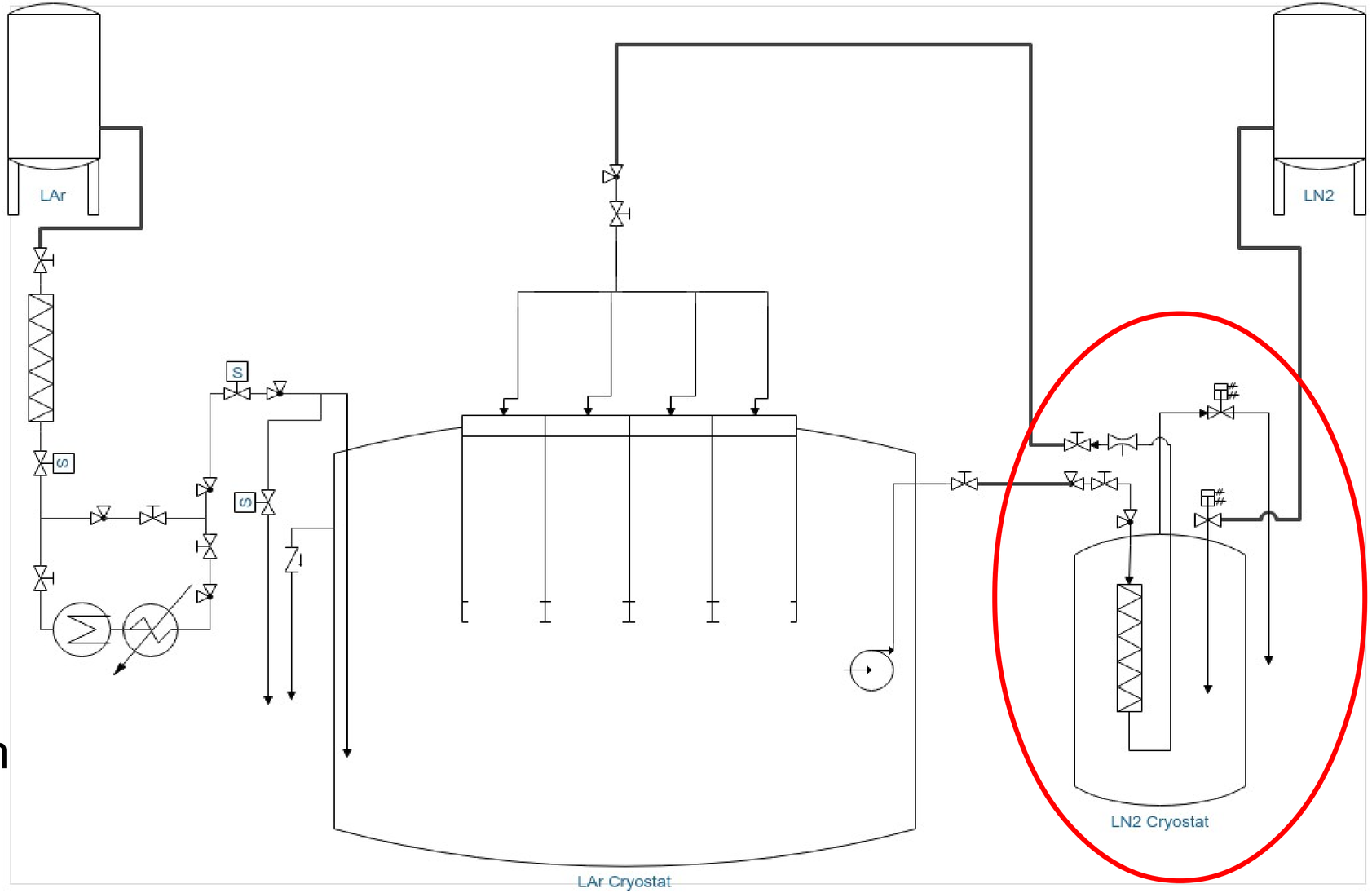
Filter

The Bern filter is LN2 cooled in an unrated LHe cryostat with a filter material container that qualifies as a pressure vessel.

We need a new filter for the next test stand in Bern, that uses LN2 cooling

Do we send this to FNAL?

Or, do we keep this filter in Bern and design one to integrate with the FNAL system and regs?



Questions

What pump arrangement is desirable?

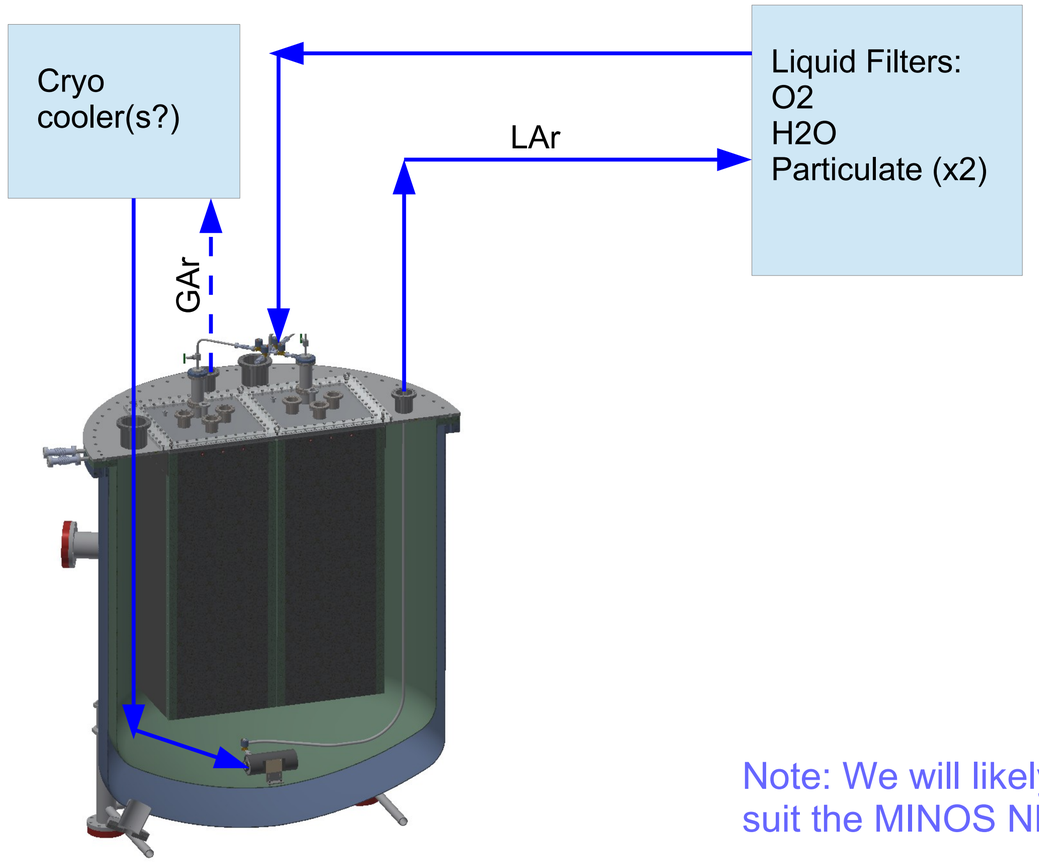
Does the pump need to arrive with the cryostat?

Is it easier to design & make a filter to match the FNAL system?

Will this delay cryo installation in MINOS ND?

Who do I talk to to get details of the planned system?

MINOS ND Cryo scheme – How best to integrate



What is the planned MINOS ND cryo scheme?

What vessels are typically used for filters at FNAL?

Are all filter components typically house din the same vessel?

What connections are needed for the filter (LAr, Temp sensors,...)?

Note: We will likely keep the VJ lines in Bern. So we will new order lines to suit the MINOS ND setup.

Bern will also be delivering Promass F 500 Coriolis Flowmeter