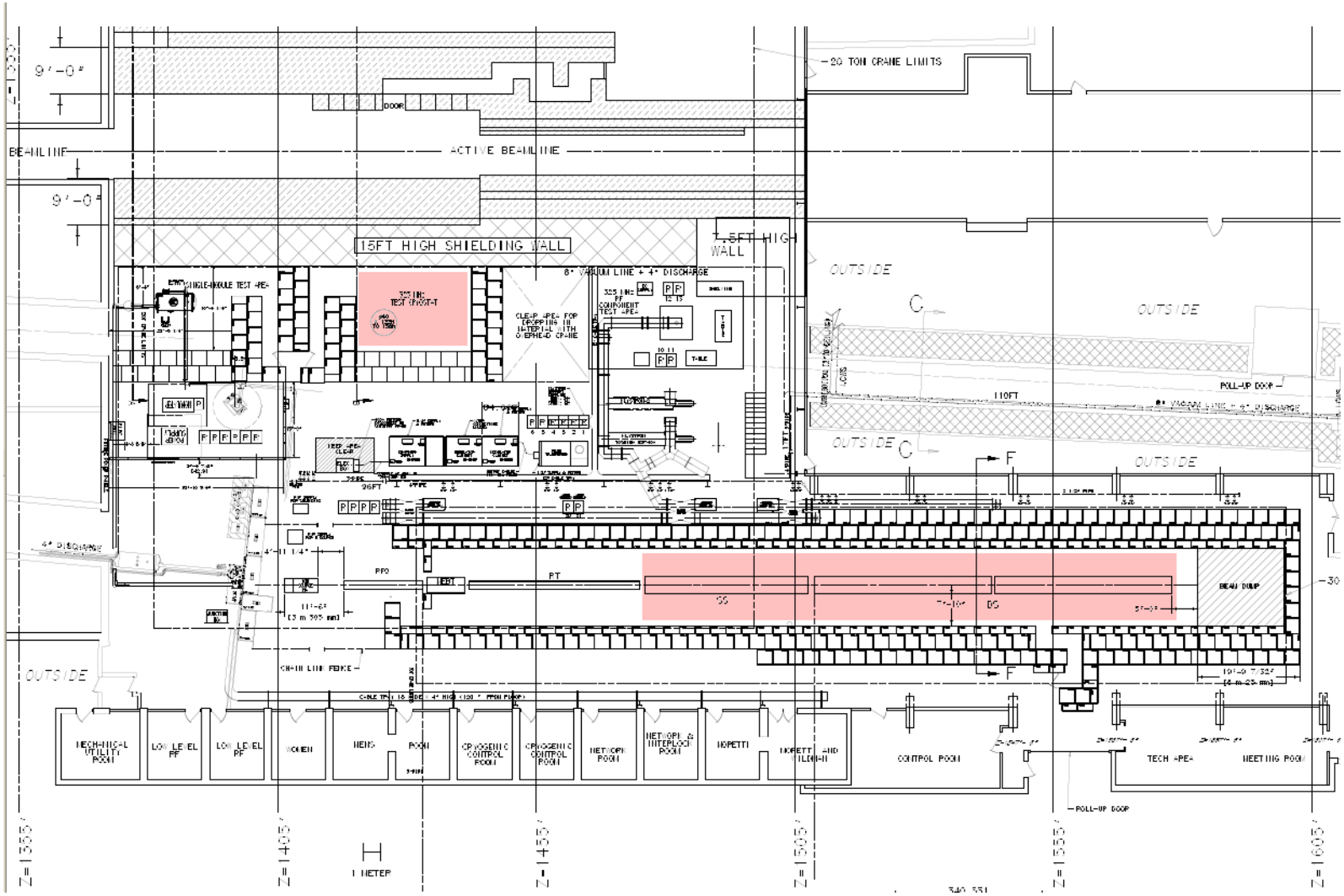
# HINS Test Cryostat 2 K Conversion Status

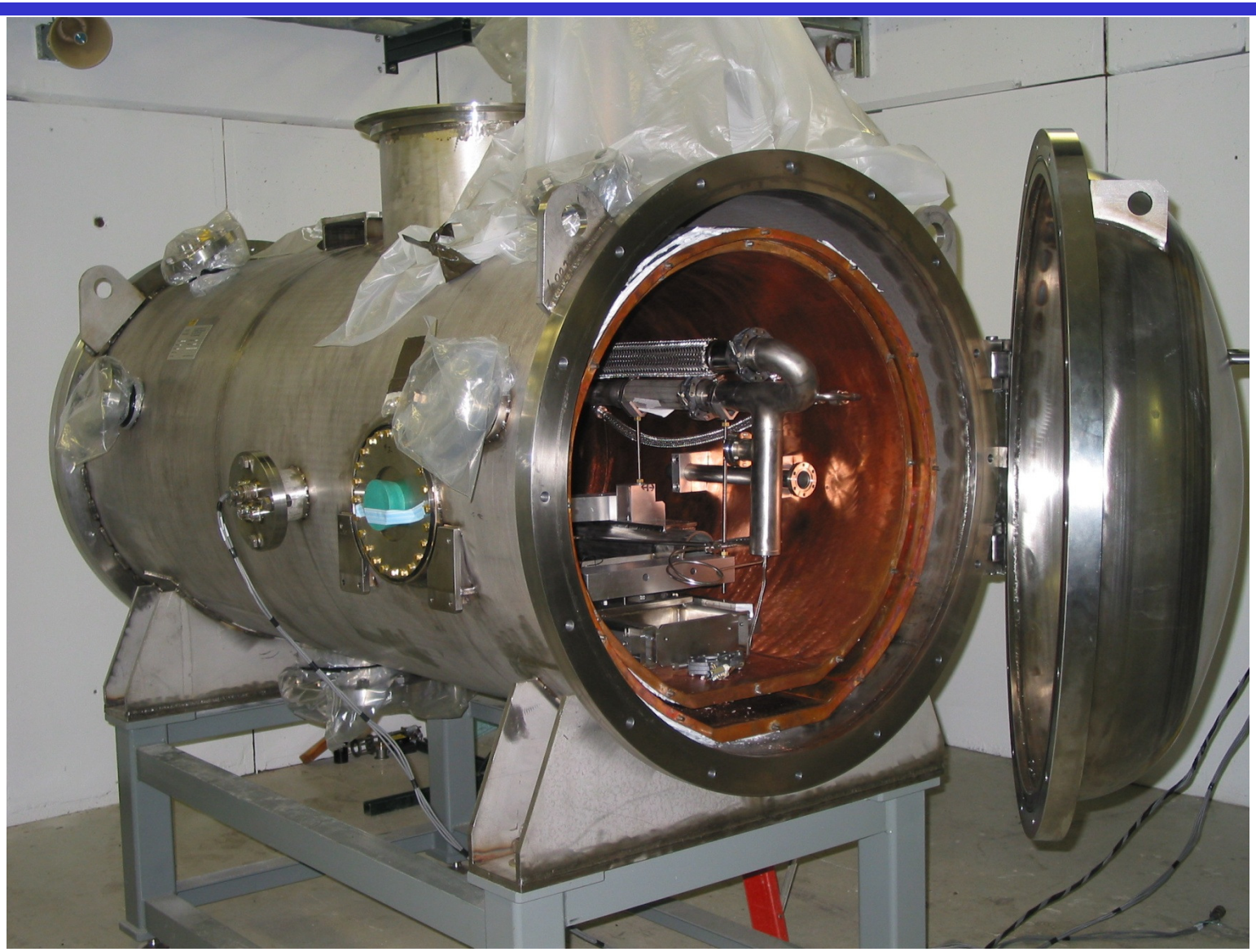
October 7, 2010

# MDB plan view



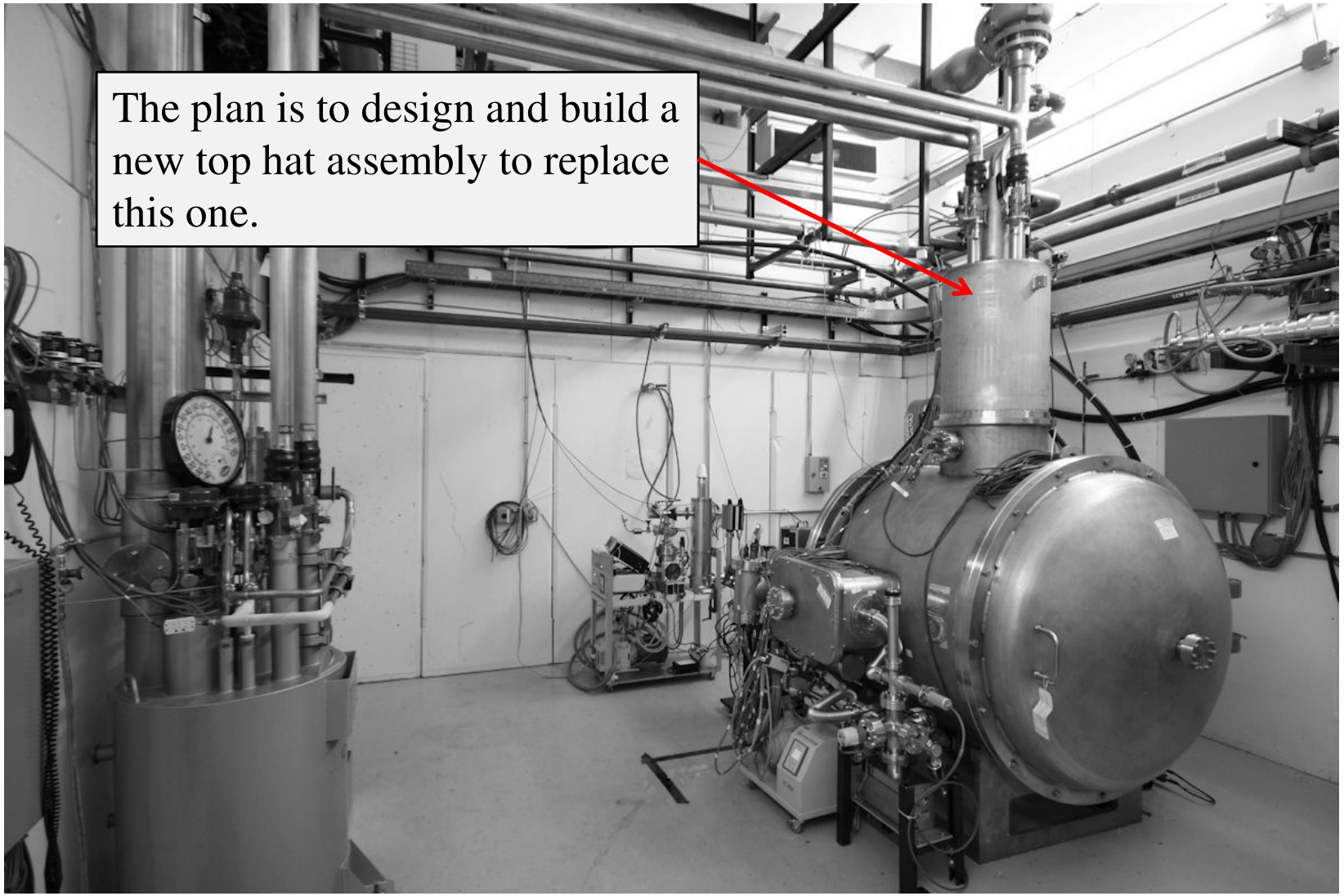
# Cavity test cryostat in MDB

# Existing elliptical cavity horizontal test cryostat in MDB

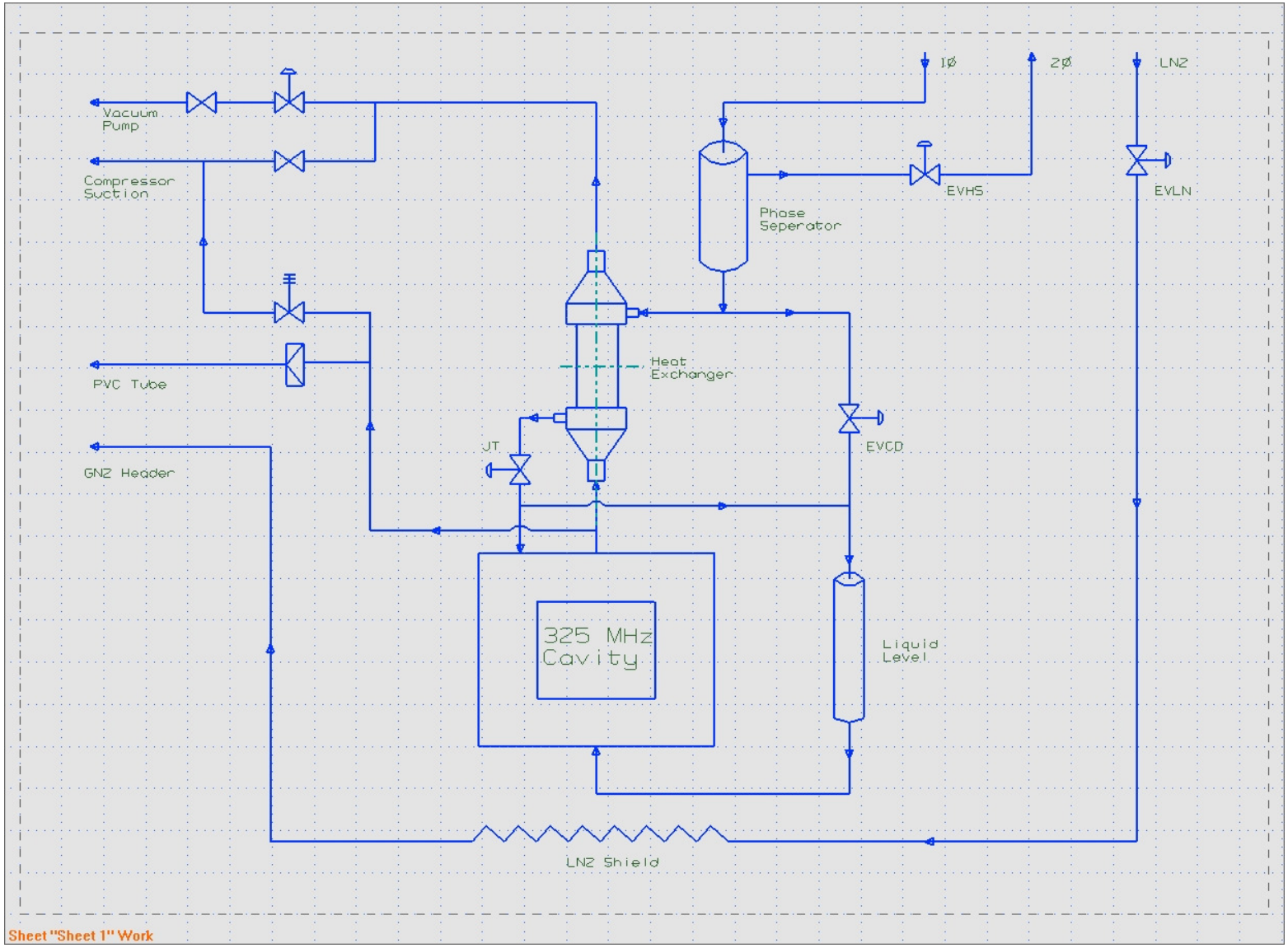


# Existing elliptical cavity horizontal test cryostat top hat

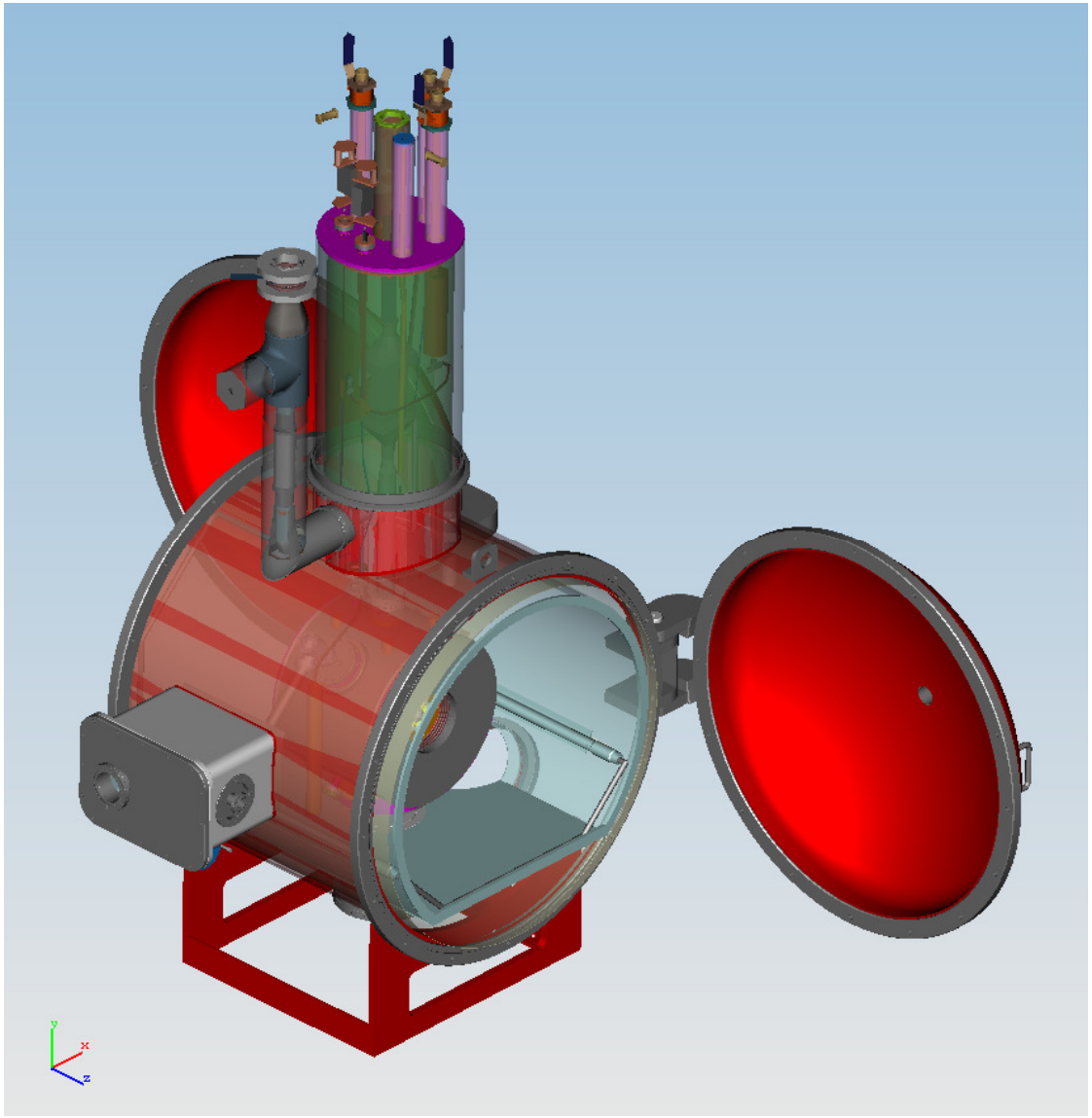
# Cavity test cryostat in MDB



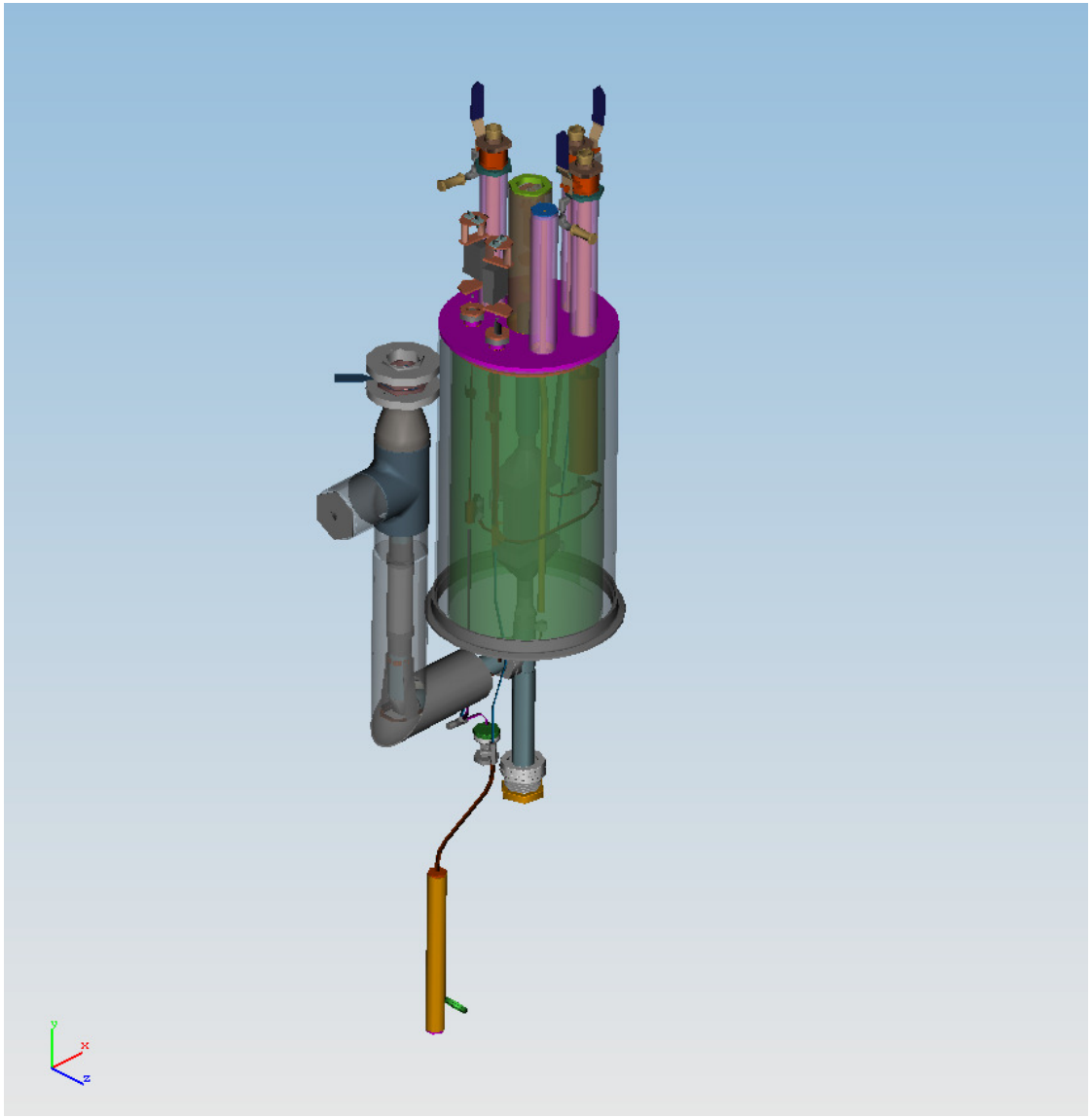
# Flow schematic



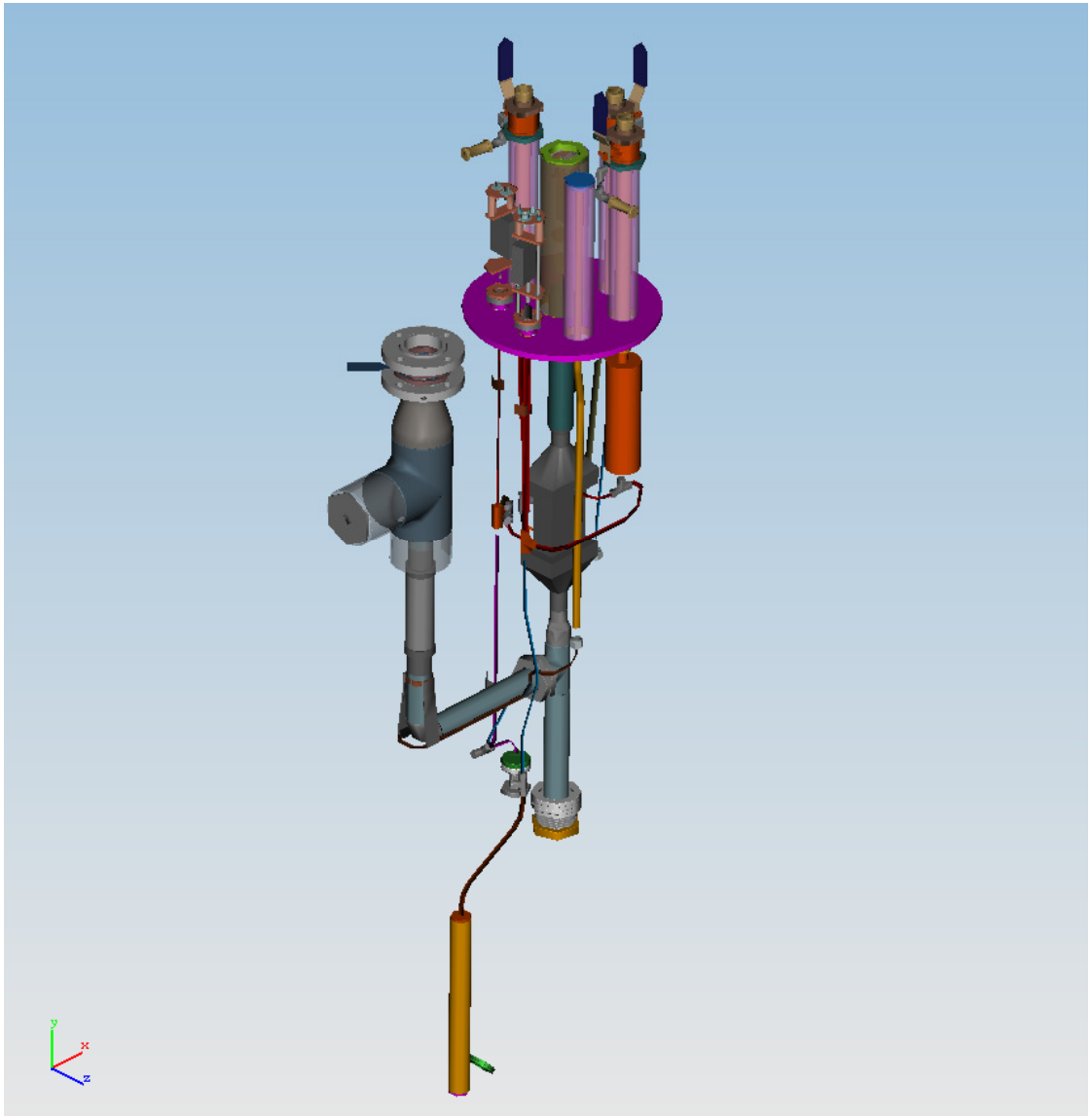
# 2 K conversion – cryostat assembly



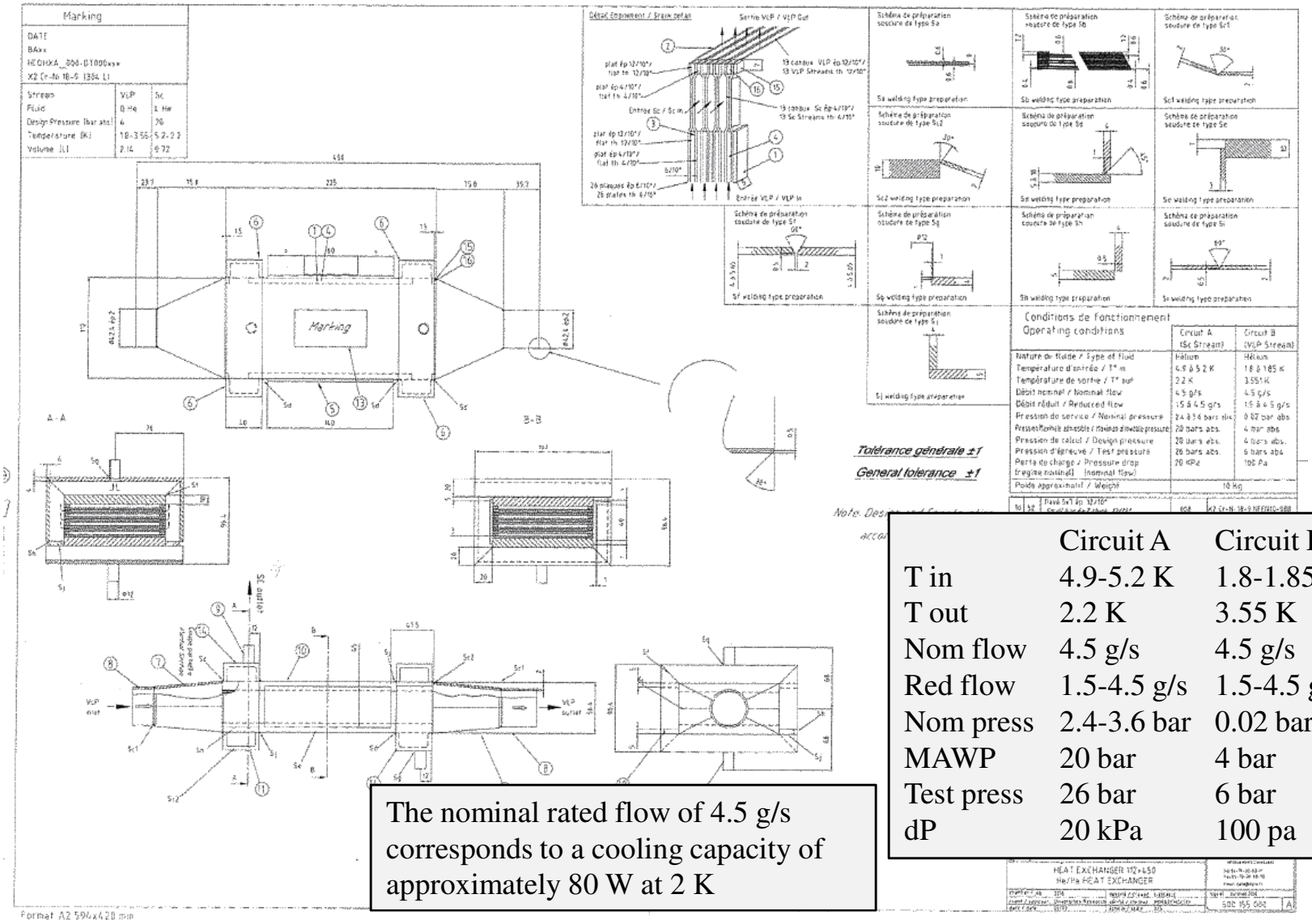
# 2 K conversion – top hat assembly



# 2 K conversion – top hat assembly



# Heat exchanger detail

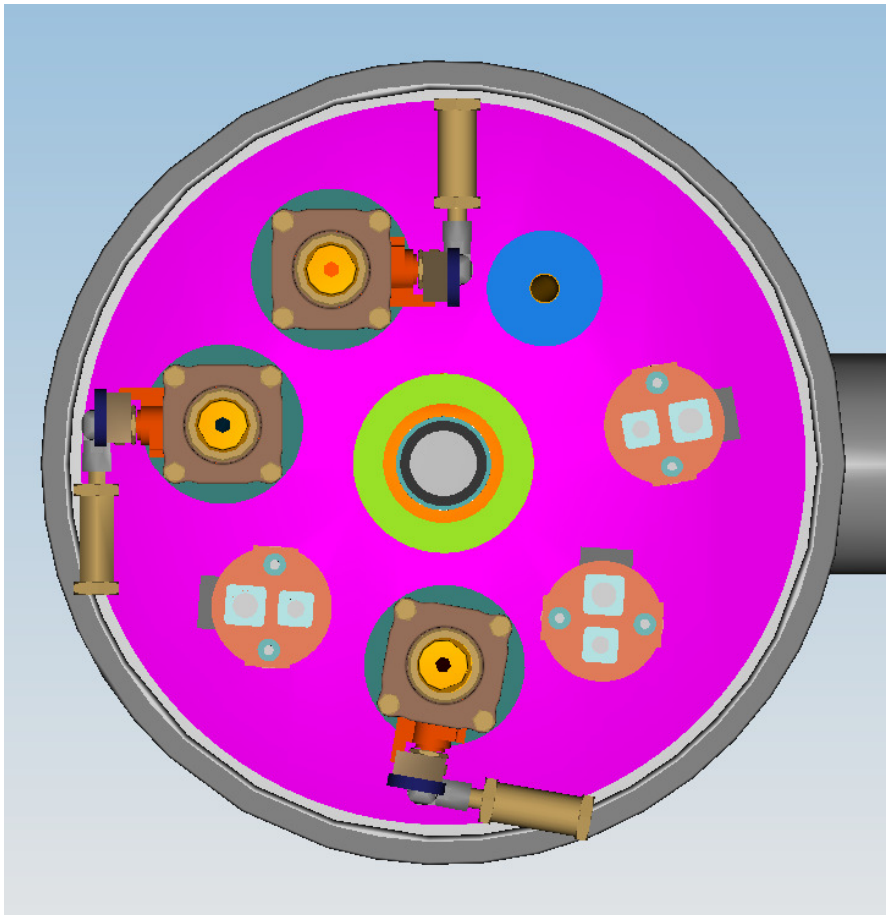


| | Circuit A | Circuit B |
|---|---|---|
| T in | 4.9-5.2 K | 1.8-1.85 K |
| T out | 2.2 K | 3.55 K |
| Nom flow | 4.5 g/s | 4.5 g/s |
| Red flow | 1.5-4.5 g/s | 1.5-4.5 g/s |
| Nom press | 2.4-3.6 bar | 0.02 bar |
| MAWP | 20 bar | 4 bar |
| Test press | 26 bar | 6 bar |
| dP | 20 kPa | 100 pa |

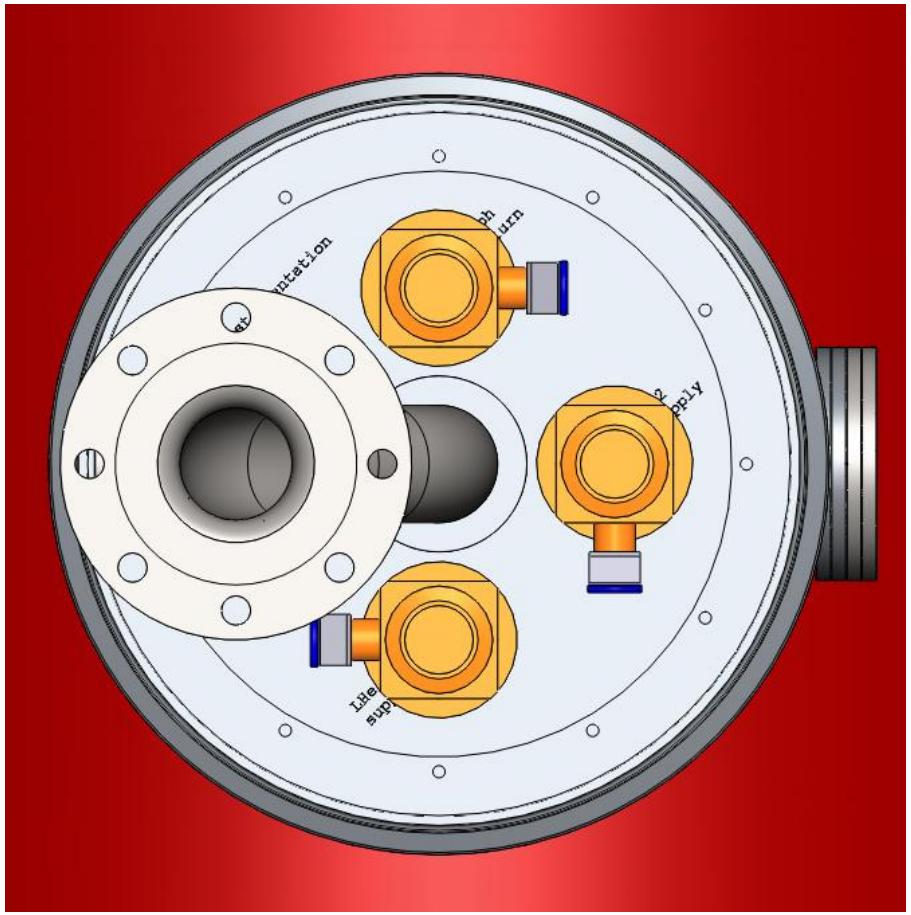
The nominal rated flow of 4.5 g/s corresponds to a cooling capacity of approximately 80 W at 2 K

# New and existing top views of the top hat assemblies

New



Existing



# Summary of changes

- 3 additional control valves mounted on the cryostat.
- Internal JT heat exchanger.
- Additional liquid volume for cavity level indicators.
- Added a cooldown/warmup circuit.
- Replace the large helium relief with a smaller operational relief and burst disk.
- Separate the relief and pumping lines (eliminates one instrumentation connector flange).
- Preserving the orientation of the existing bayonet connections, but not the locations, i.e. new transfer lines will be required.
- The existing vacuum vessel, thermal and magnetic shields, input coupler connection, and feedcan remain unchanged.

# Status

- Solid modeling and detailed design in-process. One full-time engineer and one part-time design drafter are engaged in the project.
- Need a detailed P&ID including instrumentation.
- Still working out details of interferences between the transfer lines and other associated piping.
- As-is, the existing feedcan can supply 20 g/s at 4.5 K which should be capable of providing cooling for any of the SSR cavities we plan to test. Pumping capacity should be adequate for simultaneous operation of 1.3 GHz and 325 MHz test caves.
- Pumping line for 2 K operation already transits the HINS test cave.
- We need to plan at least one department review and one review with AD/Cryo to assess the final configuration.