FP420 Cryogenics :
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CERN

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Design Philosophy

- Create a warm region in the interconnection cryostat by splitting the existing cold mass in two sections : top and bottom.

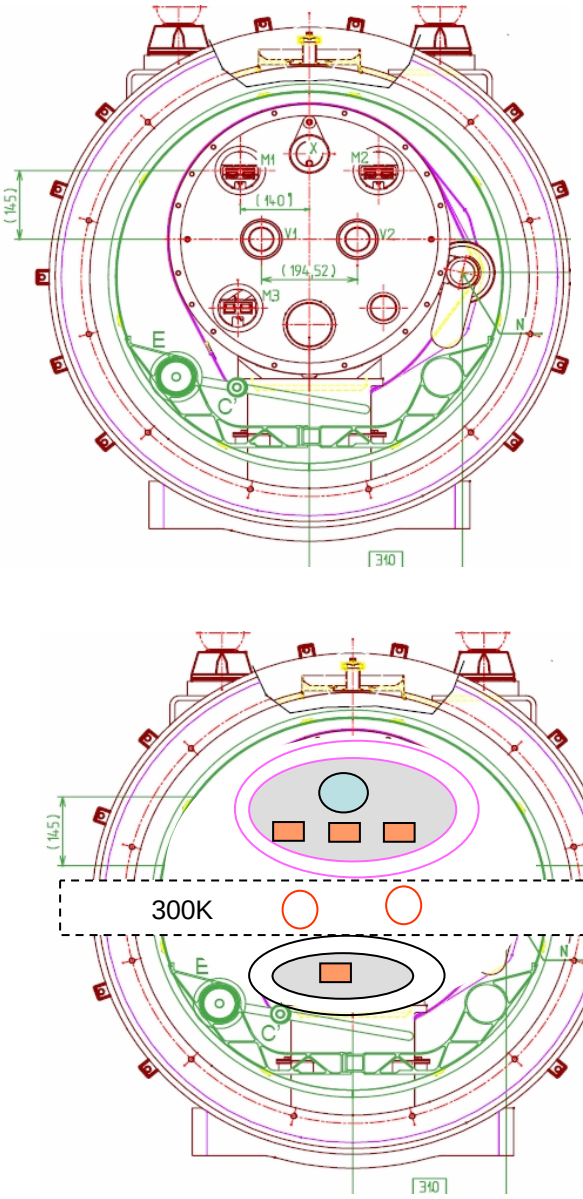
- Organise bus bars M1, M2 and M3 in a single superfluid helium volume in the top section cooled by the 1.9K heat exchanger.

- Lower section will carry auxiliary bus bars.

- The two regions will be interconnected at the end.

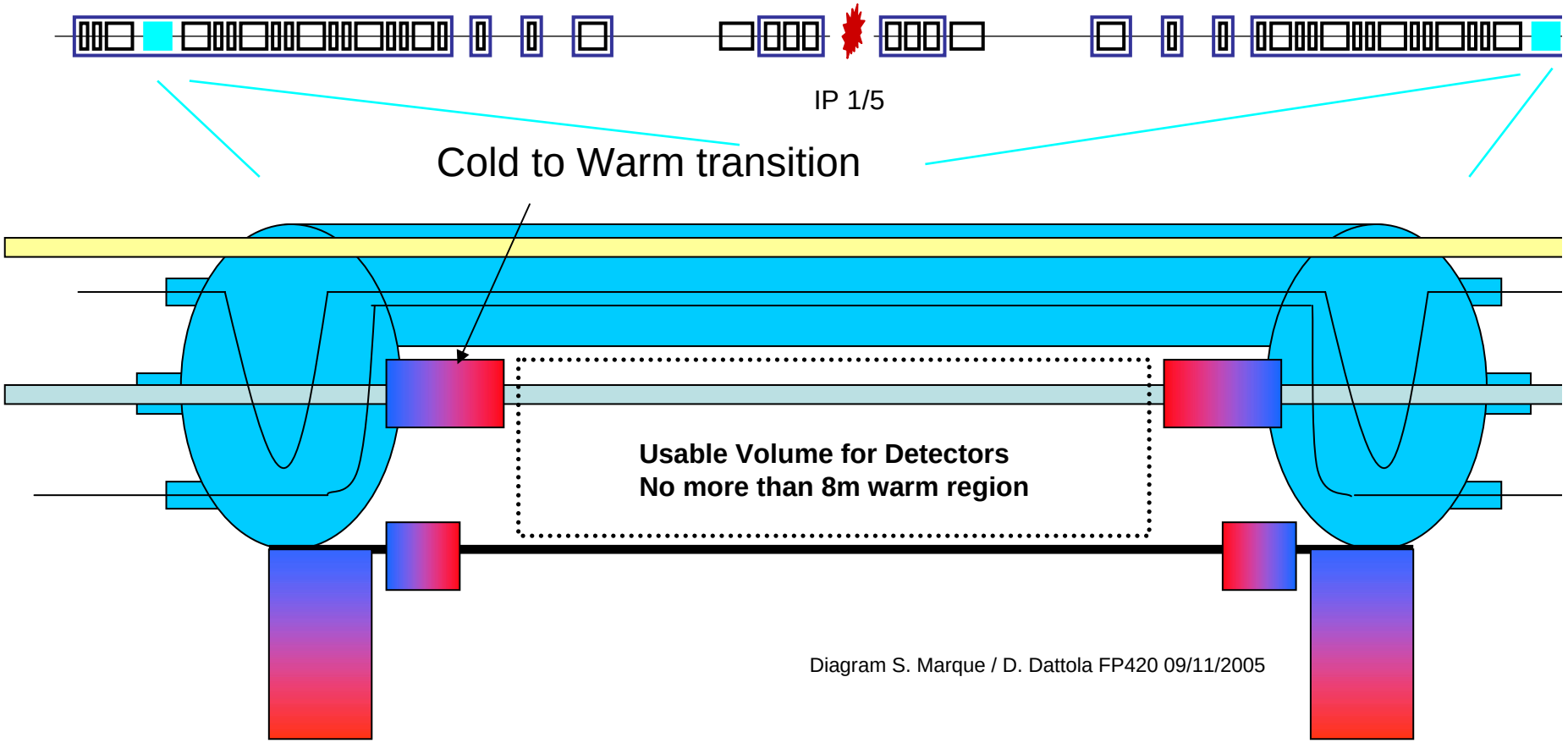
- This gives direct access to the beam pipes at 300K (RT)

- There will be cold to warm transition regions in the beam pipe. (see next slide)



FP420 Option 1

28/03/06


IP 1/5
Cold to Warm transition
Usable Volume for Detectors
No more than 8m warm region
Diagram S. Marque / D. Dattola FP420 09/11/2005

Issues :

1. Confirm that the design parameters of the Cryostat ….

   Heat Loads at 1.9K, 20K, 50 K and
   maximum pressures experienced during quench …
   Liquid helium volumes …

   do not exceed the existing limits and get acceptance from CERN authorities.

- All these parameters will have to be worked out before taking on detail design work.

2. Confirm that the new concept do not demand new assembly and test tools.

3. Any implications on the vacuum in the beam pipe.

   In-situ baking, impact on detectors etc…..

4. Access to detectors and associated electronics…

5. Cooling techniques for the detectors assembly to be resolved.

6. Impact of the heat load on the detectors due to the radiation from the beam and vice versa.

• As a ***starting point*** we start collecting key design and safety parameters for the cryostat and associated assemblies..

• Examples of **Parameters** *in random order*.

Parameter		Existing	New design	
Heat load at 1.9k	w			
Heat load at 4-20k	w			
Heat load at 50-70k	w			
Dynamic heat loads				
Vacuum level				
Cool down time				
Design pressure in (different pipes)				
Thermal cycling (how many times)				