



Cryostat 5 K Thermal Shield -- Conclusions (Proposed)

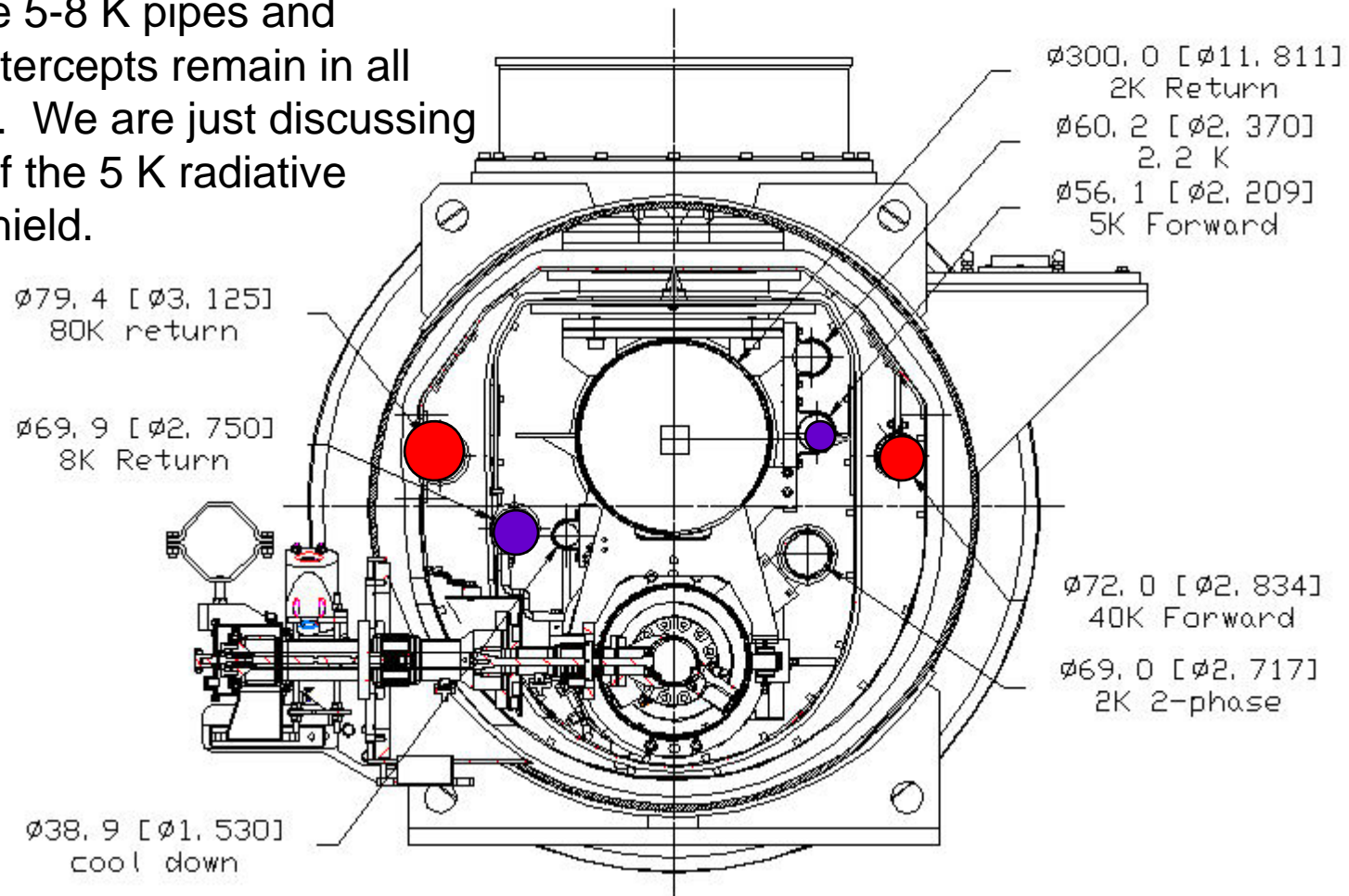
T. Peterson
23 April 2008

A horizontal line of small, yellow-green dots is located at the bottom of the slide, mirroring the one at the top.



Type 4 cryomodule

Note: The 5-8 K pipes and thermal intercepts remain in all scenarios. We are just discussing removal of the 5 K radiative thermal shield.





Conclusions

1. At a minimum, the 5-8 K thermal shield bridges at interconnects can be left out.
 - **These are not needed as thermal intercept conduction paths, and scaling from length would imply that about 10% of the thermal radiation below the 40-80K shield would go down to 2 K without these shield bridges. The simplification at the interconnects and removal of potential interferences will be a large benefit.**



Conclusions

2. With or without a 5-8 K thermal shield, we should optimize the deposition of heat on the 40-80 K circuit by careful use of forward and return lines.
 - **Use of the forward line for the 40-80 K thermal radiation shield helps to minimize overall heat reaching the 5 K or 2 K level.**
 - **Use of the 40-80 K forward line for support post intercepts combined with the 80 K return line for the largest dynamic heat loads will help to minimize the temperature variations on the support post intercepts due to dynamic heating.**
 - **These considerations require coordination of cryomodule design, cryogenic system design, and orientation with respect to cryogenic flow in the accelerator tunnel.**



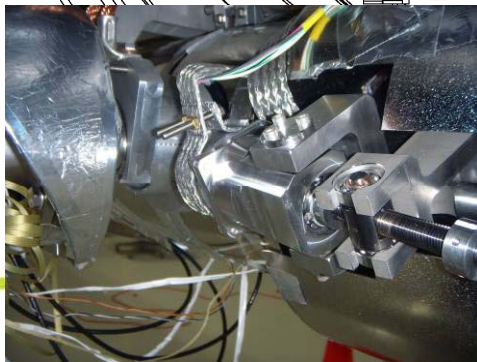
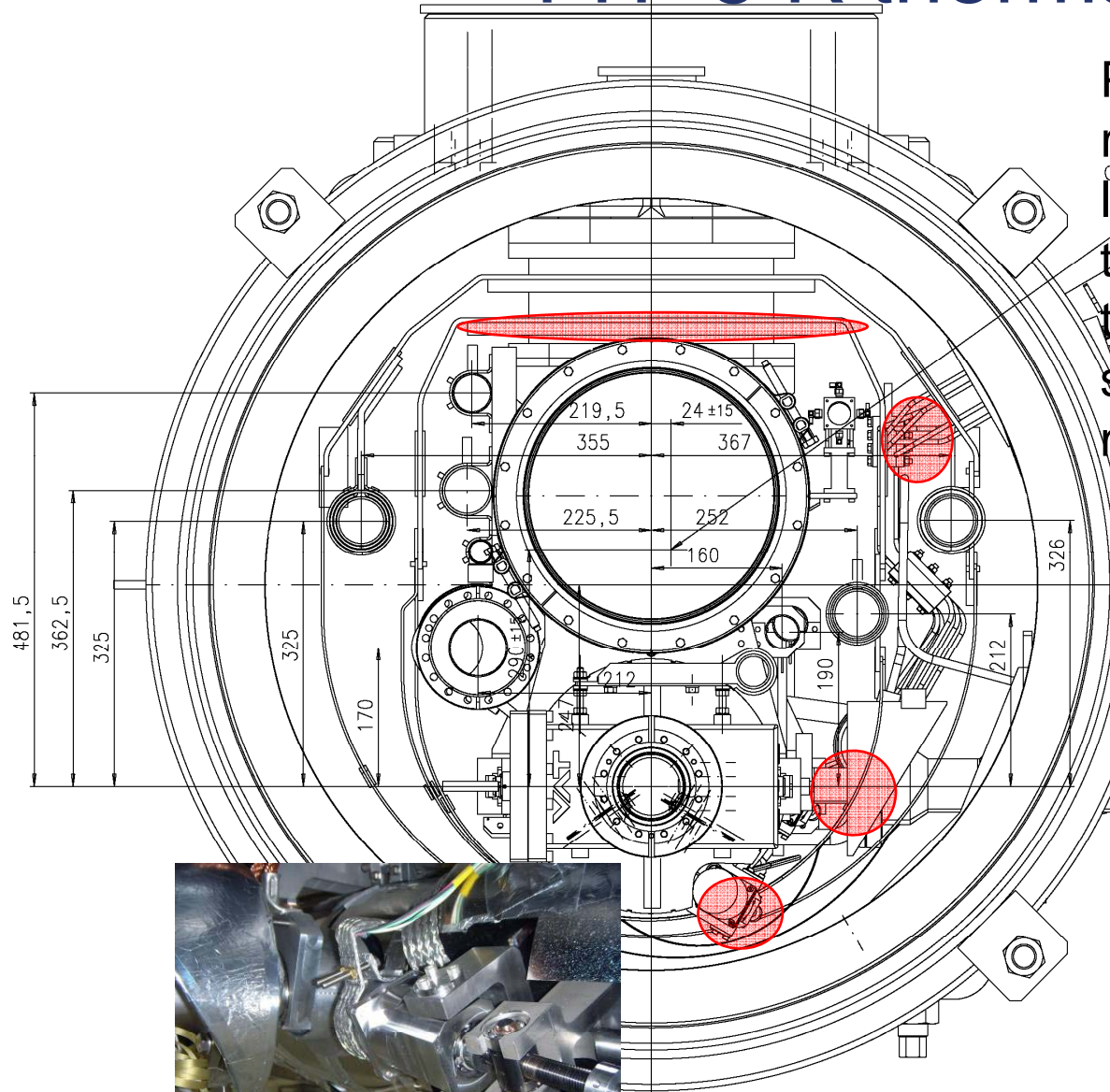
Conclusions

3. Cryomodules without a 5-8 K thermal shield may be plug-compatible with those containing a 5-8 K thermal shield.
 - **But be careful -- thermal intercepts from tuners and input couplers should have compatible attachments to whatever thermal strap is used.**
 - We should remember the interfaces for thermal intercepts as a plug-compatibility requirement, in any case.
 - **Compatibility assumes no 5-8 K thermal shield bridge in the interconnect.**
 - **We could decide to not incorporate a 5-8 K thermal radiation shield later**



TTF 5 K thermal anchors

Paolo Pierini of INFN reminded us of the locations of the various thermal intercepts and the value of the thermal shield as a conductive manifold.



5 K shield

