Design of the 650 MHz high Beta prototype cryomodule for PIP-II at Fermilab*

WEPTEV015

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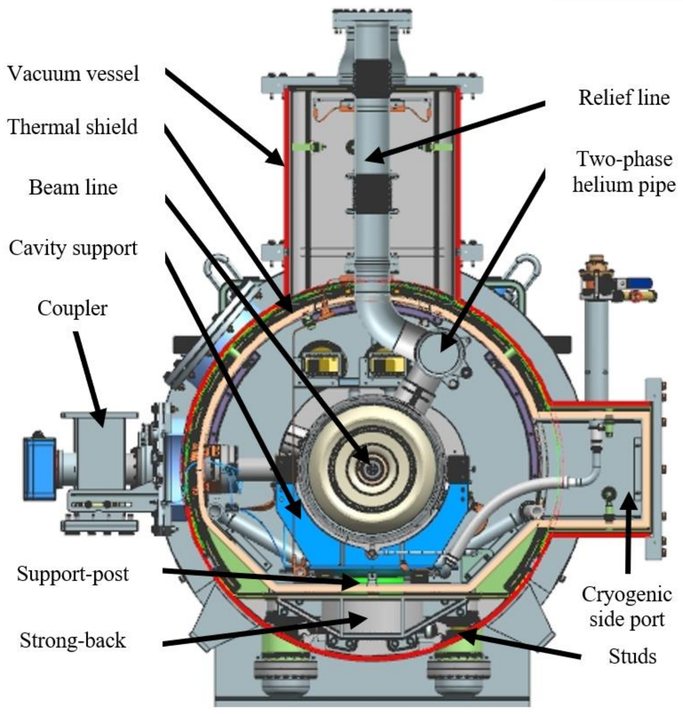
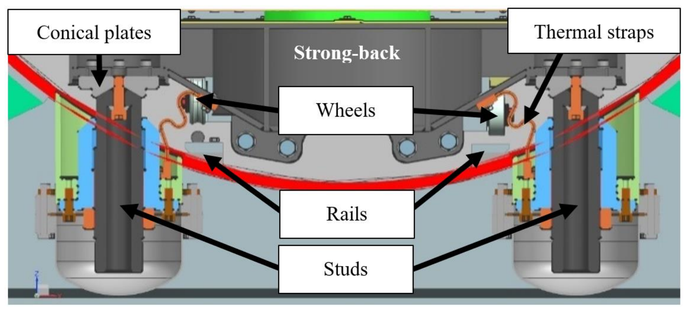
INTRODUCTION

The Proton Improvement Plan II (PIP-II) is the first U.S. accelerator project that will have significant contributions from international partners. The prototype High Beta 650 MHz cryomodule (pHB650 CM) is designed by an integrated design team, consisting of Fermilab (USA), CEA (France), STFC UKRI (UK), and RRCAT (India). The manufacturing & assembly of this prototype cryomodule will be done at Fermilab, whereas the production cryomodules will be manufactured and/or assembled by STFC UKRI, RRCAT, or Fermilab.

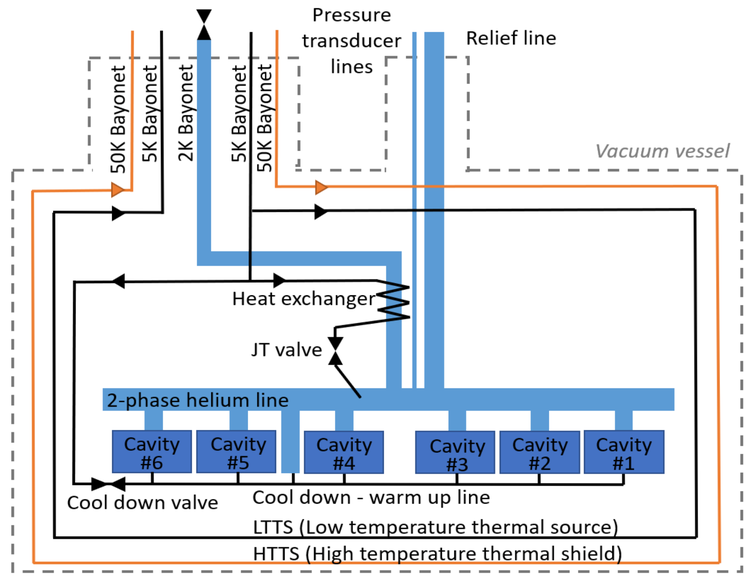
DESCRIPTION OF THE CRYOMODULE



CROSS-SECTION OF THE pHB650 CM

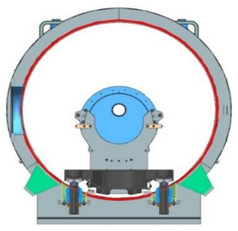


CROSS-SECTION OF THE INTERFACE BETWEEN THE VACUUM VESSEL AND THE STRONG-BACK

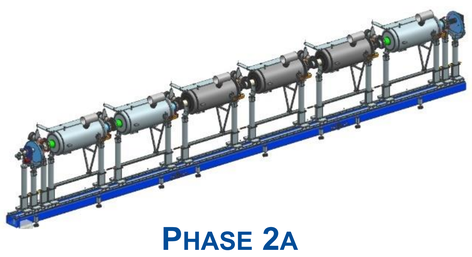


SCHEMATIC OF THE CRYOGENIC LINES

ASSEMBLY PROCESS

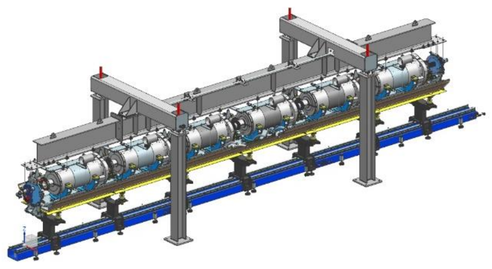


PHASE 1

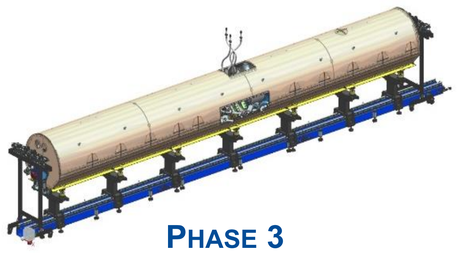


PHASE 2A

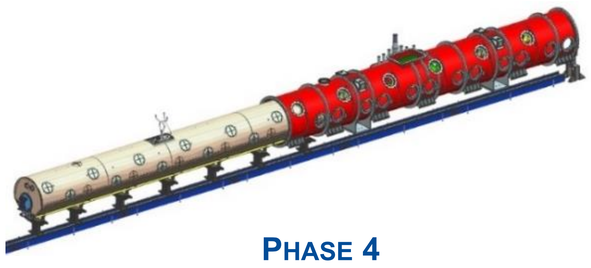
PHASE 2B



PHASE 2C



PHASE 3



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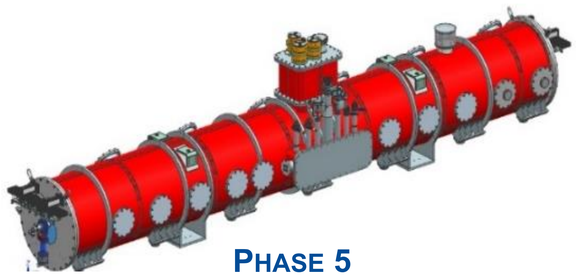

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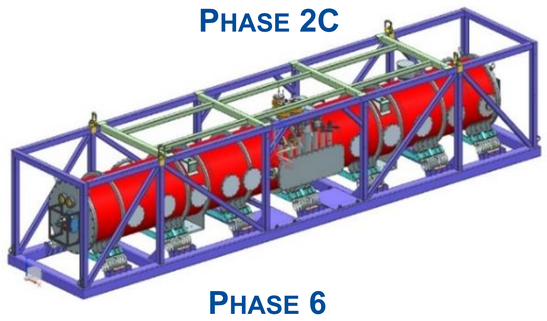

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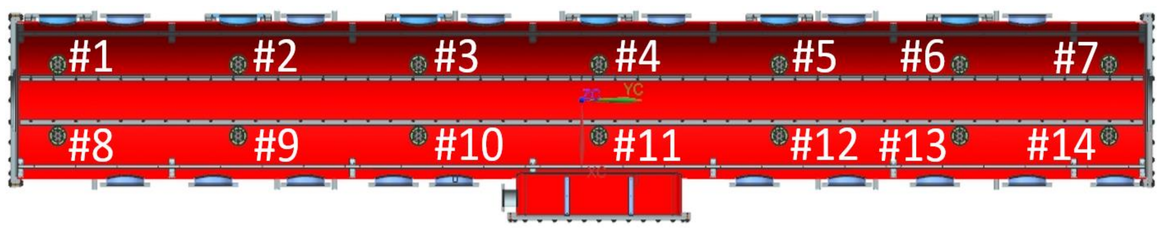

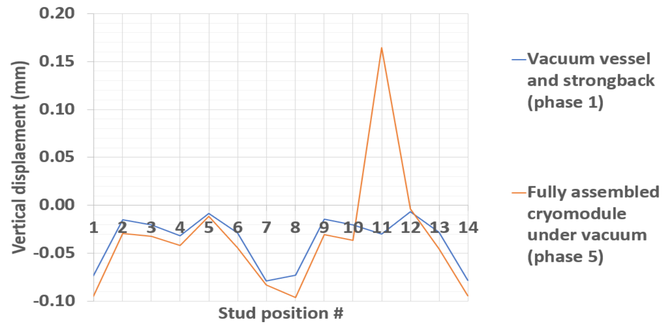

CONCLUSION

The design of the prototype High Beta 650 MHz cryomodule has been completed and the procurement phase has started. This work will be used by STFC UKRI for the assembly of the production High Beta 650 MHz cryomodules, and by CEA for the design and assembly of the pre-production and production Low Beta 650 MHz cryomodules.
The next steps of the pHB650 CM is to perform quality control after receiving the parts, assemble, test, validate the design, and implement any new lessons learned into the design optimization phase before going into production.

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