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## Industrial engineering study of FCC-hh refrigerators

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A 100 TeV hadron collider in a 100 km long tunnel is selected as the baseline of the overall infrastructure for the present FCC study. The cooling requirements for FCC-hh cryogenic system are challenging with a very large refrigeration capacity (100 kW equivalent at 4.5 K) up to 3 to 4 times larger than the present state-of-the-art and a non-conventional thermal load distribution with very large synchrotron radiation to the beam screens (50% of total heat loads). Based a reference solution proposed by the international FCC cryogenic team (CERN, TUD, CEA, WUT) to cool FCC-hh superconducting magnets and beam screens, an engineering study is undergoing with the cryogenic world-leader industries (Linde, Air Liquide) to assess industrial solutions of FCC-hh refrigerators and to confirm the innovative technologies which have to be developed in the coming years. The presentation will present the main results of this on-going industrial engineering study and highlight the identified R&D efforts in the coming years to develop reliable and efficient FCC cryogenic system.

Primary author: MILLET, Francois Presenter: MILLET, Francois Session Classification: Infrastructure and operation

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