

SST-1 CRYOGENICS REQUIREMENTS AND THE WAY FORWARD

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- ❑ SST-1 Machine consists of superconducting magnets namely sixteen TF coils and nine PF coils and associated current leads and superconducting current feeders system. 1350 W at 4.5 K capacity helium cryo system is operational since 2003-2004.
- ❑ Recent SST-1 campaigns, higher heat loads and higher pressure drop have caused undue thermal runaway in the system. Therefore, it was possible to cool only the TF coils, a pair of current leads and PF-3 (U/L) coils. Other PF coils able to cool up to 23 K-24 K at the outlet.
- ❑ In 2015, the efforts were made to upgrade the IFDC system for better cool down and flow controls within the PF coils. The basic philosophy was adopted to group the similar path lengths PF coils using the combination of on/off and flow control cryo valves.
- ❑ Efforts on heat loads mitigation have given better results on cold capacity saving. Further the mitigation task is under progress.
- ❑ In order to resolve these issue, we have addressed few short term and long term plans as mentioned, (i) Cryo heat loads minimization and mitigation within the SST-1 to the best possible level. (ii) Introduction of efficient design of the current leads as “cold capacity saver” (iii) PF3 (U/L) current leads in SST-1 using NBI cryo plant of capacity 140 W at 4.5 K (equivalent to 45 l-h⁻¹ liquid helium production rate) (short term). (iv) Full-fledged PF coils operation with the TF coils by additional similar capacity helium plant (1500 W at 4.5 K). The paper, a brief review of the installed cryo sub-systems as well as the plans of simultaneous cool down of the TF and PF coils of SST-1 will be discussed.