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C3Po1F-05 [35]: Cryogenic System for Shanghai Synchrotron Radiation Facility

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The Shanghai Synchrotron Radiation Facility (SSRF) is an intermediate energy light source built at Zhang-Jiang Hi-Tech Park in Shanghai, China. The RF power and voltage required for storing the electron beam are provided by means of three SC cryomodules, each containing one 500 MHz superconducting cavity. A cryogenic plant with cooling capacity of 650 W at 4.5 K (herein called SSRF-I cryoplant) supplied by Air Liquide advanced Technologies has been in operation since August of 2008 to provide cooling for the three superconducting cavities.
In order to further improve the performance of Shanghai Synchrotron Radiation Facility (SSRF), the following SC devices are to be applied for the SSRF upgrade (SSRF-II):
1) 2 harmonic SRF cavities with 1.5 GHz will run alternatively at 2 K (31 mbar).
2) One superconducting wiggler is to be used for one of the new-built beam lines, ultra-hard multi-functional beam line. The SC wiggler will be cooled by cryocoolers at 4.2 K region.

To support the operation of the new cavities, AL-aT (Air Liquide advanced Technologies) has designed, manufactured and started a new cryogenic system including a 2K system with equivalent cooling capacity of at least 650 W at 4.5 K and 60 W at 2K. The system is mainly constituted of a refrigerator HELIAL MF, an auxiliary 2K cold box and of a 2 K warm pumping station.
This cryogenic unit has been started successfully at the end of 2018 and has proven performances both at 4.5K and at 2K.

Primary author: ANNE, Barbier (Air Liquide Advanced Technologies)

Co-authors: Mrs MACHEFEL, Annelise (Air Liquide Advanced Technologies); MANTILERI, Christophe Michel (Unknown); Mr ROGEZ, Edouard (Air Liquide Advanced Technologies); CUI, Jian (Shanghai Institute of Applied Physics, Chinese Academy of Sciences); XU, Jieping (Shanghai Institute of Applied Physics. CAS); ROIG, Mathieu (AIR LIQUIDE Advanced Technologies); Mr MACCAGNAN, Michel (Air Liquid Advanced Technologies)

Presenter: ANNE, Barbier (Air Liquide Advanced Technologies)

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