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Performance analysis of cryogenic system and cryomodules for the complete superconducting linear accelerator at IUAC, New Delhi.

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The heavy ion superconducting linear accelerator as a booster of 15 UD pelletron accelerator is commissioned and operating for more than a year. The acceleration is achieved by a series of superconducting quarter wave bulk niobium cavities at 4.2 K. In the first phase, accelerator was partly commissioned with 8 cavities in first linac cryomodule along with superbuncher and rebuncher. In the second and final phase two more linac cryomodules with eight cavities each were installed in beam line. New helium refrigerator of Linde make LR 280 along with the additional section of liquid helium distribution line were integrated with existing CCI make helium refrigerator. The cooling philosophy for five beam line cryomodules with the new refrigerator was modified to have faster cooling rate of 20 – 25 K of the cavities against earlier 8- 10 K/hr in the critical zone of 150- - 70 K. Pressure fluctuation in the helium vessel of cavities was reduced significantly to avoid frequent breaking of RF locks. The paper will discuss in detail about the performance of new cryogenic system and the cryomodules during beam acceleration run. A detailed experimental analysis on thermal response of helium refrigerator with variable heat load from the cavities will be reported.

Primary author: Dr DATTA, Tripti Sekhar (Inter- University Accelerator Centre. New Delhi. India)

Co-authors: Mr CHOUDHURY, Anup (Inter- University Accelerator Centre. New Delhi. India); Mr CHACKO, Jacob (Inter-University Accelerator Centre. New Delhi. India); Mr ANTONY, Joby (Inter- University Accelerator Centre); Mr KUMAR, Manoj (Inter- University Accelerator Centre. New Delhi. India); Mr SAHU, Santosh (Inter-University Accelerator Centre. New Delhi. India); Mr KAR, Soumen (Inter- University Accelerator Centre. New Delhi. India); Mr BABU, Suresh (Inter-University Accelerator Centre. New Delhi. India)

Presenter: Dr DATTA, Tripti Sekhar (Inter- University Accelerator Centre. New Delhi. India)

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