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WARM UP CHARACTERIZATION AND OPTIMIZATION OF A SUPERCONDUCTING QUARTER WAVE RESONATOR CAVITY INSIDE A TEST CRYOSTAT.

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Content :

Cool down and warm up of a cryostat to and from liquid helium(LHe) temperature (4.2 K) is a common practice in cryogenics engineering environment. At Inter University accelerator Center (IUAC), a test cryostat has been in operation for the performance study of the superconducting quarter wave resonator (QWR) for more than a decade. It has a liquid helium capacity of 120 liters. It is surrounded by an annular liquid nitrogen(LN₂) jacket which also guards the cavity. A total 45 number of cold tests has so far been conducted in this cryostat. Normally after an individual QWR performance study at LHe temperature is done, it takes about 4 days to warm up the cryostat naturally to room temperature. During warm up process the cavity temperature should always be above surrounding LN₂ vessel temperature which helps to prevent impurity deposition on pristine resonator surface. A sequential warm up procedure has been adopted to warm up the resonator and helium vessel within 12 hours after the completion of cold test. The efforts made to achieve this cavity warm up with in the given boundary condition, experimental results obtained during the optimization of the warm up of the cryostat and a comparison of heat transfer between the previous scenario with the new development will be presented in this paper.

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