

Design and Thermal Simulation Analysis of the Chinese Accelerator Driven Sub-Critical System Injector-I Cryomodule

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Abstract : The Chinese Accelerator Driven Sub-critical system (C-ADS) uses a high-energy proton beam to bombard the metal target and generate neutrons to deal with the nuclear waste. The Chinese ADS proton linear has two 0~10 MeV injectors and one 10~1500 MeV superconducting linac. Injector-I is studied by the Institute of High Energy Physics (IHEP) under construction in the Beijing, China. The linear accelerator consists of two accelerating cryomodules operating at the temperature of 2 Kelvin. This paper describes the structure and thermal performances analysis of the cryomodule. The analysis takes into account all the main contributors (support posts, multilayer insulation, current leads, power couplers, and cavities) to the static and dynamic heat load at various cryogenic temperature levels. The thermal simulation analysis of the cryomodule is important theory foundation of optimization and commissioning.

Keywords : C-ADS, cryomodule, structure, thermal simulation, static heat load, dynamic heat load

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