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Design and testing of high power test bench for CiADS elliptical superconducting cavity input coupler

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The Chinese initiative Accelerator Driven Subcritical System (CiADS) proposed by the Insitute of Modern Physics (IMP) will use 58 650 MHz input power couplers for low β and high β elliptical superconducting cavities, for continuous wave power up to 130 kW. Pre-design of 650 MHz couplers has been completed. In order to validate the performance of these couplers and effectively eliminate soft Multipacting through high power testing. A high power test bench was designed, machined and commissioned for 650 MHz elliptical superconducting cavity couplers. Due to the different coupling antenna lengths of the two types of superconducting cavity couplers, transmission performance of up to -35 dB was achieved by optimizing the structure of the test cavities of the high power test bench. The high power test bench utilizes forced air cooling to effectively reduce excessive temperature rise during high power testing. The high power test procedure for this coupler is also presented to be effective in reducing the conditioning time of the couplers.

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Footnotes

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