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Design and conditioning of a low thermal load coupler for conduction-cooled accelerators

Monday 22 September 2025 14:30 (3 hours)

Thermal management of high-power input couplers is a critical challenge in conduction-cooled superconducting accelerators. This work presents a low thermal load input coupler design featuring a detachable electromagnetic shield and a variable impedance stub to guide microwave-induced heat toward the 50 K region. RF and thermal simulations confirm its efficient power transmission and reduced heat load at cryogenic temperatures around 4 K. Experimental tests validate the electromagnetic shielding performance. High-power conditioning demonstrates stable 70 kW CW power transmission under ultra-high vacuum, meeting the dual requirements of low thermal load and high RF power handling for conduction-cooled accelerators.

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Yes

Footnotes

Funding Agency

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