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## High power conditioning of the prototype power coupler for CSNS-II spoke cavity

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The prototype fundamental power coupler (FPC) and superconducting spoke cavity for the China Spallation Neutron Source upgrade project (CSNS-II) were manufactured before January 2023. To validate functionality, the FPC must undergo high power conditioning process prior to its assembly with the cavity. However, the high power conditioning process is quite complicated, it involves aspects like clean processing and assembly in the clean room, ultra-high vacuum acquisition, S parameter measurement and adjustment, cooling and monitoring conditions arrangement, test platform integration, and so on. In this paper, we will describe the complete process from receipt to test completion, and some problems encountered are also outlined. Finally, the FPC is high power conditioned to a peak power of 400 kW with a 3% duty factor in traveling wave mode and 75 kW with a pulse length of 1.2 ms (25 Hz repetition rate) in standing wave mode with 16 different reflection wave phases, it fully satisfies the requirement of spoke cavities for CSNS-II —200 kW peak power with 3% duty factor.

### Footnotes

### Funding Agency

### Paper preparation format

### Region represented

Asia

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