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## 2.45 GHz Microwave Ion Source Operation for 170 kW SRF Linac Long Term Commissioning

Continuous wave (CW) ion beam power of 170 kW has been recently demonstrated with the Superconducting Radio Frequency (SRF) linac CAFE at IMP. A 2.45 GHz microwave ion source was used as the beam injector at the warm front end. For the stable operation at such a beam power, total extraction beam current of more than 25 mA was delivered at the beam energy of 20 keV according to the design requirements of the RFQ. For the long duration reliable operation with such a low extraction energy and relatively strong space charge effect, the distance and positioning of each electrode were carefully optimized and collimated to avoid any beam trip due to the beam losses and high voltage discharge on the electrodes. The time interval between two beam trips is typically about 20 hours during the ion source operation. This paper will report the long term operation status of the 2.45 GHz ion source for CAFE high power test. The critical issues and challenges during this scenario will be discussed.

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