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ESS RF power station (400 kW @ 352 MHz) for spokes: issues identified due to soak testing and operational insights

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The first section of the ESS superconducting linac is the Spoke Linac, which raises the beam energy from 90 MeV to 216 MeV. This is achieved by 26 superconducting spoke cavities, housed in 13 cryomodules. These cavities are powered by Spoke RF Power Stations (RFPS), each delivering a maximum power output of 400 kW at 352 MHz. This power is generated by combining the outputs of two tetrode TH595A-based amplifiers using a hybrid combiner.

The RFPS units are supplied by Elettra as part of Italy's in-kind contribution to the ESS. To date, 27 RFPS units have been delivered to ESS, with 26 installed and commissioned in the ESS gallery. The RFPS units have been utilized to test and qualify various systems. The interfaces for the Personal Protection System (PSS) and the Machine Protection System (MPS), both critical for beam operation, have also been successfully validated. Additionally, the RFPS units were employed in the warm and cold coupler conditioning of the spoke cavities. They will continue to be used for cold cavity conditioning and beam commissioning.

This paper addresses the issues identified during soak testing and the corresponding mitigations that were implemented.

Footnotes

Paper preparation format

Word

Region represented

Europe

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