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Availability improvements for the LIPAc RF Power System: tetrodes and solid state solutions

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The IFMIF/EVEDA Accelerator Prototype (LIPAc) is currently under construction in Rokkasho (Japan). LIPAc will generate a 9 MeV deuteron beam at 125 mA current with a 100% of duty cycle, and it will serve to validate the final IFMIF accelerator concept.

The radiofrequency (RF) Power System, which is being integrated by CIEMAT (Spain) and its partner companies and institutes, consists of 18 RF amplifier chains operating at 175 MHz: eight 200 kW chains for the radio-frequency quadrupole (RFQ); two 105kW chains for the re-buncher cavities of the Medium Energy Beam Transport (MEBT); and eight 105 kW chains for the superconducting half-wave resonator (HWR) cavities. It also comprises 12 high voltage power supplies (HVPS), which feed the final amplifiers, 18 coaxial transmission lines to reach the accelerator cavities, and the water cooling system primary circuit. Very high availability, high performance, and easy maintainability are the main objectives for this development. Dealing with such a challenging goals has required successive improvements in the reference design. All the details regarding the different proposals and developments will be described in this paper.

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