

detailed design of radiation dose monitoring system has been completed according to the characteristics of secondary radiation, and the fabrication of neutron dosimeters in SECR, iLinac and low-energy experimental terminal have been completed.

7 - 17 Successful Development of High Gradient Magnetic Alloy RF System for HIAF-BRing

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The synchrotron RF team of High Intensity heavy-ion Accelerator Facility (HIAF) successfully developed the first low-frequency broadband, high gradient, fast response, oil-cooled magnetic alloy (MA) RF system in China.

1. Advanced Automatic MA Core Production Line

After more than ten years of technical research, the RF team has solved a series of key technical problems from materials to production processes, and jointly built the first high-performance MA core automation production demonstration line with independent intellectual property rights in China with domestic manufacturers, achieving the volume production of high-performance and large-sized MA core. The key parameters of the MA core meet the needs of HIAF projects, and it also has supported domestic related projects and other industries. (Fig.1).

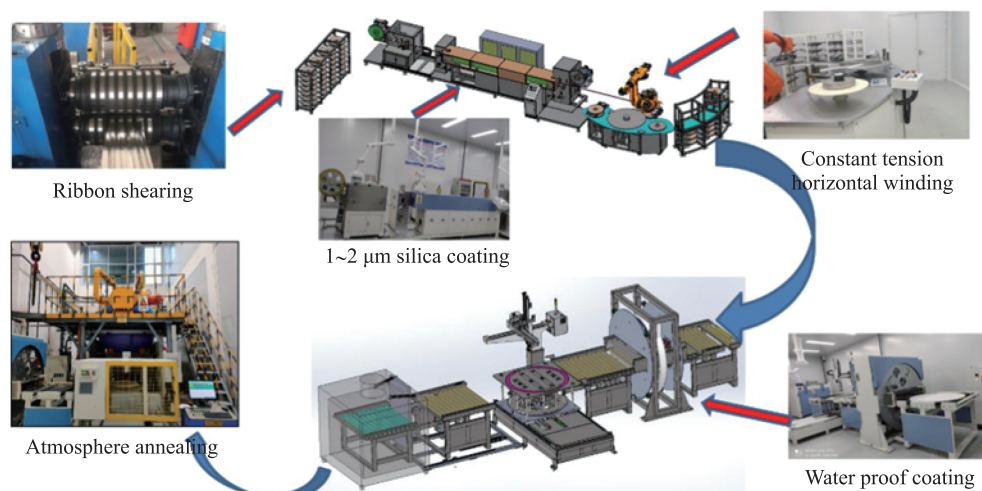


Fig. 1 (color online) Advanced automatic MA core production line.

2. The First oil-cooled MA RF System in China

On above basis, the first low-frequency, broadband, oil cooled MA core RF system in China has been successfully developed (Fig. 2). The cavity voltage achieved 66 kV (gradient > 30 kV/m) within the frequency range of 0.29 to 2.1 MHz, harmonic suppression > 23 dBc, amplitude stability $|A/A| \leq 1\%$, phase stability $|\varphi| \leq 1^\circ$

3. Performance Improvement of Domestic Large-sized MA Core

The RF team has successfully developed a new liquid cooled $\phi 780$ mm MA core (CFT-L) with better broadband characteristics in the frequency range of 0.1 to 20 MHz. As given in picture below (Fig. 3), the key parameters of new core are 30% higher than the same type of MA core (FT-3L), which can further increase the cavity voltage.

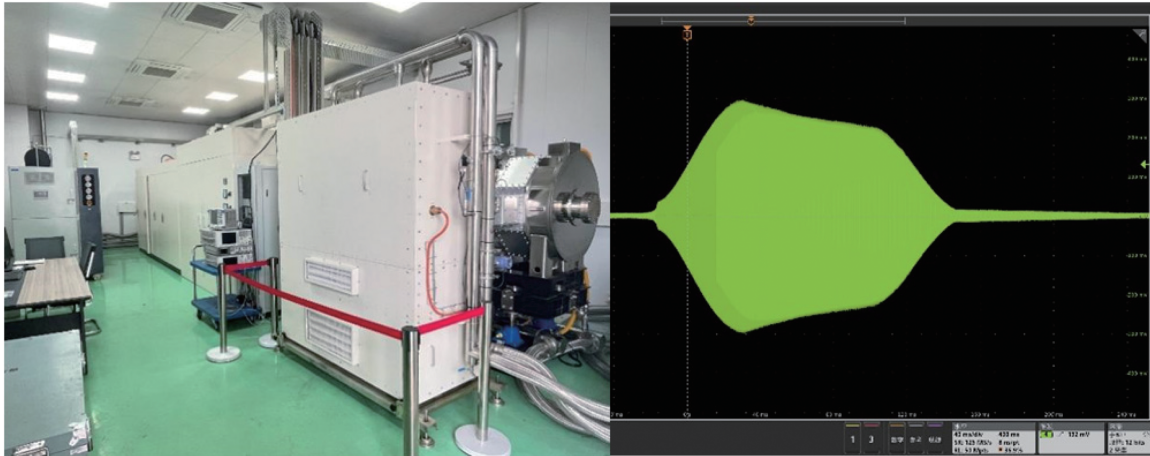


Fig. 2 (color online) MA RF system and Cavity pick-up voltage of ramping mode.

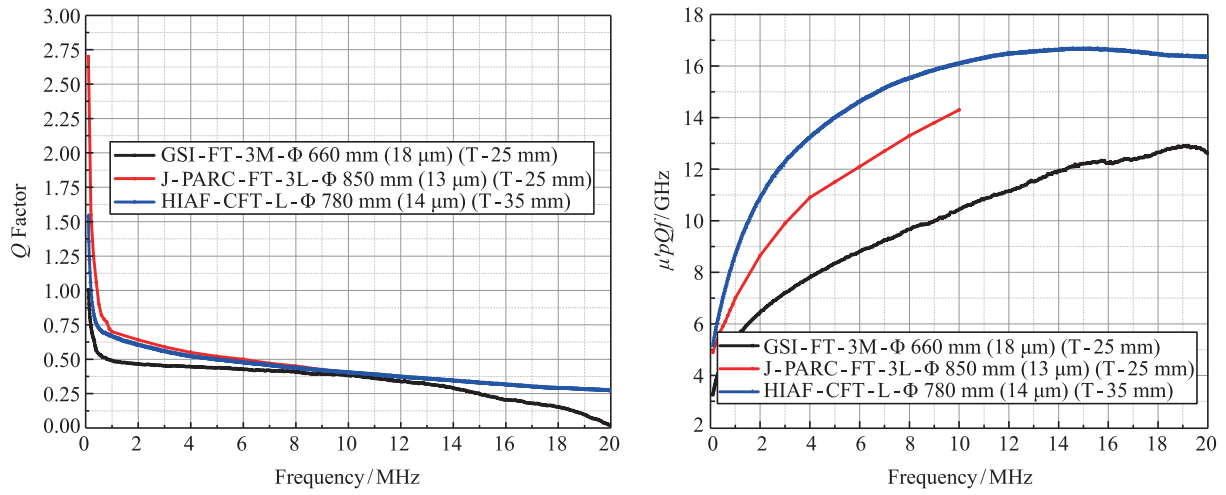


Fig. 3 (color online) Parameters of GSIJ-PARC vs HIAF MA core.