

HIAF-Bring Magnetic Alloy Loaded RF System Design and Testing

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High Intensity heavy-ion Accelerator Facility (HIAF) is a major scientific and technological infrastructure project of the 12th Five Year Plan in China. It will be the heavy ion beam device with the highest pulse current intensity in the world. HIAF has the characteristics of fast ramping, high current and high energy. It puts forward high index requirements for the RF system of synchrotron. HIAF-Booster Ring RF system mainly consists of four parts: magnetic alloy (MA) loaded cavity, high-power broadband RF amplifier, high-precision digital low-level RF (LLRF) system and computer controller. The LLRF system is designed based on the VPX platform. On above basis, the first low-frequency, broadband, oil cooled MA loaded RF system in China has been successfully developed. The cavity voltage achieved 66kV (gradient $> 30\text{kV/m}$) within the frequency range of 0.29 to 2.1MHz, harmonic suppression $> 23\text{dBc}$, amplitude stability $|\Delta A/A| \leq 1\%$, phase stability $|\Delta \phi| \leq 1^\circ$.

Keyword

HIAF, Magnetic Alloy Loaded RF System, Synchrotron

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