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## **Development and preliminary results of radio frequency ion source**

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The neutral beam injector (NBI) on the Experimental Advanced Superconducting Tokamak (EAST) is designed with high power of 2-4 MW and long pulse of 10-100 s. The hot cathode bucket ion source is employed on the EAST-NBI system. Consider the lifetime of hot cathode during long pulse operation and the future requirement of high power ion source of NBI for the next generation of fusion device, the radio frequency (RF) ion source was designed and development.

A RF driver has a cylinder structure with diameter of 210 mm and height of 160 mm. The thickness is 8 mm. A copper faraday shield with thickness of 3 mm is installed in the RF driver. A 6 turns RF coil with outer diameter of 6.5 mm and inner diameter of 4mm is installed out the driver to couple the RF power to plasma. A manual marching box is also designed with RF frequency of 1 MHz frequency. The RF driver was tested on the RF driver test bed. The puffer gas can be changed between with hydrogen and argon. The RF power can achieve 10 kW with stable plasma. The plasma parameters were measured with double probe system.

In the future, the auto marching box will be developed and the RF plasma will be tested with RF power large than 10 kW. Besides, a RF source with two drivers will be development and tested too.