Recent results from Pilot GAMMA PDX-SC experiments

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We constructed a superconducting (SC) mirror Pilot GAMMA PDX-SC (PGX-SC) to contribute heat and particle control for a DEMO fusion reactor. PGX-SC consists of a pair of SC coils and a pair of Cu coils, a steady state plasma source, a main chamber, a differential pumping chamber and an end chamber for divertor simulation. A cascade arc plasma source and a helicon plasma source have been developed in order to produce high density and large diameter plasma. 28 GHz gyrotron is used for second harmonic heating. Significant increase in the electron density and expansion of plasma diameter were observed when ECH was applied, but the ECH duration was restricted to 10 ms due to the influence of the magnetic field leaking from the superconducting coil in the gyrotron tube. Magnetic shield will be installed around the gyrotron tube for longer ECH heating. An ICRF wave with a frequency of 1.8 MHz and a power of 160 kW was applied to plasma sustained by a cascade arc plasma source. An ion-sensitive probe indicated that high-energy ions were produced by the ICRF power. Fluctuations during ICRF heating were decreased by biasing edge plasma.