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Improved beta (local beta > 1) and density in electron cyclotron resonance heating on the RT-1 magnetosphere plasma

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This study reports the recent progress in improved plasma parameters of the RT-1 device. Increased input power and the optimized polarization of electron cyclotron resonance heating (ECRH) with an 8.2 GHz klystron produced a significant increase in electron beta, which is evaluated by an equilibrium analysis of Grad-Shafranov equation. The peak value of the local electron beta β_e was found to exceed 1. In the high beta and high-density regime, the density limit was observed for H, D, and He plasmas. The line average density was close to the cutoff density for 8.2 GHz ECRH. A density limit exists even at the low beta region. This result indicates the density limit is caused by the cutoff density rather than the beta limit. From the analysis of interferometer data, the uphill diffusion produces a peaked density profile beyond the cutoff density.

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