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## Ion heating in magnetosphere plasma device RT-1

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While the stable high-beta ( $\beta \sim 1$ ) confinement by a dipole magnetic field was successfully demonstrated with high-temperature electrons ( $T_e > 10$  keV) [1, 2], the heating of ions was a challenge. We have made two major progresses in this direction. (i) We developed a system for ion cyclotron resonance of frequency (ICRF) heating, and demonstrated the active heating of ions by launching a slow wave. The ion temperatures in the core region are increased in hydrogen, helium and deuterium plasmas. The differences of temperatures among ion species suggest a strong influence of the charge-exchange loss by which the bulk ions remain relatively cold ( $< 20$  eV) in comparison with impurity ions. (ii) We also found a spontaneous heating mechanism concomitantly occurring with the up-hill diffusion [3, 4].

- [1] H. Saitoh et al., Phys. Plasmas 21 (2014) 082511.
- [2] M. Nishiura et al., Nucl. Fusion 55 (2015) 053019.
- [3] N. Sato et al., <http://arxiv.org/abs/1510.08571>, in 2015.
- [4] Y. Kawazura et al., Phys. Plasmas 22 (2015) 112503.

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