Abstract Submitted
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Detection of anisotropy in the electron velocity distribution produced by electron cyclotron resonance heating using the polarization of helium atom emission lines[1] TAIICHI SHIKAMA, TATSUYA TERAMOTO, AKIRA UEDA, MASAHIRO HASUO, Department of Mechanical Engineering and Science, Graduate School of Engineering, Kyoto University — The deviation of the electron velocity distribution (EVD) from isotropic Maxwellian is seen in various interesting plasma phenomena, and for a better understanding of the phenomena and detailed comparisons between experiments and kinetic simulations, it is necessary to develop a method that can measure the three-dimensional EVD shape (or the two-dimensional shape assuming axisymmetry around the magnetic field). However, this has not yet been established for the existing techniques. In this study, the anisotropy in the EVD was measured using the polarization of two helium atom emission lines, 2^1P3^1D (668 nm) and 2^3P3^3D (588 nm), in a helium electron cyclotron resonance (ECR) discharge plasma. A small polarization degree of less than 4% was measured by adopting a temporal modulation technique. It was found that the polarization originated locally from around the ECR layer and that the anisotropic component of the EVD produced by ECR heating had an average kinetic energy of approximately 40 eV.

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Taiichi Shikama
Department of Mechanical Engineering and Science, Graduate School of Engineering, Kyoto University

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