Development of a compact thermal lithium atom beam source for measurements of electron velocity distribution function anisotropy in ECR plasmas

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Anisotropy of the electron velocity distribution function (EVDF) can be deduced from the polarization of emission induced by anisotropic electron-impact excitation \[1\]. In this paper, we have developed a compact thermal lithium atom beam source for the spatially resolved measurements of the EVDF anisotropy in ECR plasmas. The beam system is designed such that the ejected beam has a slab shape, and the beam direction is variable. The divergence and flux of the beam are evaluated by experiments and calculations. The developed beam system is installed in an ECR plasma device with a cusp magnetic field \[2\], and the LiI 2s-2p emission (670.8 nm) is observed in a low-pressure helium plasma. The two dimensional distributions of the degree and direction of the polarization in the LiI emission are measured by a polarization imaging system. The evaluated polarization distribution suggests the spatial variation of the EVDF anisotropy.