

Session 5

(Invited) Electron temperature anisotropy explored by the impact polarization of the Lyman-alpha line in fusion plasma

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We have succeeded to detect polarization of the hydrogen Lyman-alpha line in the Large Helical Device, a heliotron type fusion experimental machine. With the help of an atomic model simulation, the anisotropy in the electron velocity distribution function in terms of the ratio of electron temperatures between parallel and perpendicular directions to the magnetic field is evaluated. The results show that the ratio of parallel to perpendicular temperatures takes value of roughly 0.1 while the Thomson scattering diagnostic gives the perpendicular temperature of 50 eV at the plausible Lyman-alpha emission location. This ratio increases to 0.5 when the Thomson scattering temperature decreases to 10 eV. On the other hand, no clear dependence of the ratio on the electron density is observed.