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Experimental Investigation on the Boltzmann Relation for a Bi-Maxwellian Plasma JIN-YOUNG BANG, CHIN-WOOK CHUNG, Electrical Engineering, Hanyang University, Republic of Korea — The Boltzmann relation is applied to the electron density distribution in plasmas. However, Maxwellian electron distributions are assumed. New Boltzmann relation with bi-Maxwellian electron distributions is derived from the fluid equation and compared with the experimental results in inductively coupled plasma. It is found that the spatial distribution of the electron density is governed by the effective electron temperature and that of the cold and hot electrons is governed by each electron temperature. The increase in the effective temperature around the plasma sheath interface is negligible, thus the effective temperature at the discharge center can be simply used as the temperature in the Boltzmann relation.

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