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Phase resolved measurement of anisotropic electron velocity distribution functions in a radio frequency discharge DIRK LUGGENHOELSCHER, DRAGOS CRINTEA, VIKTOR KADETOV, CHRISTOPHER ISENBERG, UWE CZARNETZKI, Ruhr University Bochum — In inductively coupled radio frequency discharges the electron velocity distribution function is harmonically modulated in time and this is equivalent to the oscillating current density generated in the plasma by the induced electric field of the antenna. This oscillation is measured temporally resolved by Thomson scattering with a frequency doubled Nd:YAG laser with a pulse length of 8 ns which determines the temporal resolution. From the measured electron velocity distribution the electron temperature and the density can be derived. The displacement of the distribution shows the drift of the electron ensemble along the direction of the induced field. Further, we will introduce a novel phase resolved emission spectroscopic technique that allows absolute measurement of the same quantity by analyzing the modulation of the atomic excitation by electron collisions. The experiment is carried out in an ICP (f = 13,56 MHz) with a planar antenna of 10 cm radius in argon at low pressures in the Pa regime.

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