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THz Diagnostics for Electron Density Measurement UWE CZARNETZKI, Ruhr Univ Bochum — In recent years THz spectroscopy has shown its potential as a versatile diagnostics for electron density measurements [1, 2]. The basic principle is similar to classical interferometry but there are remarkable differences that make this new diagnostics quite unique. fs-laser pulses generate, by means of a GaAs semiconductor, coherent ps pulses with a broad spectrum ranging from a few 100 GHz to a few THz. These pulses experience dispersion when passing through a plasma. By applying Fourier transformation to the detected time dependent electric field, the frequency dependent dispersion relation is directly measured. Comparison with theory yields the plasma density. The technique is insensitive to vibrations, is not affected by magnetic fields up to about one Tesla, and provides superb temporal resolution of about 100 ps. Moreover, effective parallel acquisition of the temporal plasma evolutions over adjustable periods, e.g. in the ms range, is possible with modern electroncs. The technique will be introduced and the potential for further development discussed. [1] S.M. Meier et al, JPhysD 50, 245202 (2017). [2] S.M. Meier et al, PSST 27, 035006 (2018).

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