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Spectral Emission of fast non-Maxwellian Atoms at metallic Surfaces in low density Plasmas SVEN DICKHEUER, OLEKSANDR MARCHUK, Forschungszentrum Juelich GmbH, IEK-4 Plasmaphysik, Trilateral Euregio Cluster (TEC), 52425 Juelich, CHRISTIAN BRANDT, Max-Planck-Institut fuer Plasmaphysik, 17491 Greifswald, Germany, ALBRECHT POSPIESZCZYK, Forschungszentrum Juelich GmbH, IEK-4 Plasmaphysik, Trilateral Euregio Cluster (TEC), 52425 Juelich — We have observed Doppler shifted components of the Balmer-lines emitted by fast non-Maxwellian atoms using different targets in a linear magnetized plasma in the PSI-2 device. In a pure hydrogen plasma the Doppler shifted components of the Balmer emission lines cannot be detected above the signal-to-noise-ratio (C. Brandt et al. O3.J107, EPS Conference (2015)). However, in a mixed H/Ar plasma with composition of 1:1 the Doppler red- and blue-shifted components can be clearly observed. The Balmer-lines are analyzed by optical emission spectroscopy at observations angles of 35° and 90°. For target materials we use Ag, Pd, Fe and C. An acceleration potential can be applied to the target to change the kinetic energy of the incoming ions between 40 and 200 eV enabling the observation of the Doppler shifted components. The emission mechanism is discussed in details and is probably due to excitation transfer from metastable argon atoms to the fast hydrogen atoms. The Doppler shifted signal can be used to determine the properties of the surfaces, e.g., the energy and angular distribution of reflected atoms. Also the spectral reflectance of the target surface can be obtained and tested against the reference data and measurements with light calibration sources.

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