

Abstract Submitted
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Method for spectroscopic determination of sub-nanosecond electric field development in argon plasmas using a time-dependent line-ratio approach TOMAS HODER, Masaryk University, Brno, Czech Republic, MARKUS BECKER, DETLEF LOFFHAGEN, Leibniz Institute for Plasma Science and Technology, Greifswald, Germany — A time-dependent collision-radiative model and method is proposed to determine the electric field strength with sub-nanosecond resolution. This method is based on measuring emission intensities of radiative transitions of selected 4p states of atomic argon and evaluation of their ratio development by the non-steady state model. Strong dependence of ratio of selected excitation rate coefficients on E/N is used as a theoretical reference. This line-ratio method enables to reveal ultra-short local electric field variations in rapidly changing plasmas, such as nanosecond pulsed, dielectric barrier or filamentary streamer discharges. In practice, emission intensities of atomic lines can be measured with such resolution using streak and picosecond gated cameras or using time correlated single photon counting techniques.

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