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**RF Micro Atmospheric Pressure Plasma Jet: Numerical Simulation and Laser Diagnostics** KARI NIEMI, JOCHEN WASKOENIG, TIMO GANS, Centre for Plasma Physics, Queen's University Belfast, Northern Ireland, UK — Micro atmospheric pressure plasma jets ($\mu$-APPJs) can provide high concentrations of radicals at a low gas temperature, particularly for modification of sensitive surfaces, e.g. in biomedicine. The diagnostics of microplasmas is extremely challenging, therefore numerical simulations offer a further insight. The presented 1D-model is a numerical fluid-model across the discharge gap. Dual frequency excitation promises enhanced radical production. Numerical simulations are restricted due to the lack of available data for surface processes which are crucial in case of the extraordinary high surface to volume ratio. These data can be derived using measurable quantities as fixed input parameters of the model. The $\mu$-APPJ provides an excellent optical diagnostic access to the discharge volume. Absolute atomic radical densities can be measured by two-photon laser-induced fluorescence spectroscopy. Absolute measurements require knowledge of collision-induced de-excitation processes or time resolved measurement of the fluorescence decay, e.g. with a tuneable UV Fourier-limited Pico-second laser system.

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