

Space resolved ozone detection in the effluent of a cold atmospheric pressure plasma jet

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Ozone is a biological active agent and long-living molecule. Therefore it plays an important role for decontamination processes and interaction with human cells. To know the ozone concentration is also important for risk management. The ozone concentration and production rate of an atmospheric-pressure plasma jet operated with argon and small admixtures of dry oxygen and wet argon were investigated by UV absorption measurements in the Hartley band. This technique determines high space resolved distributions of the ozone concentrations in the plasma effluent. For plasma medicine applications it is important to know how the ozone concentration in the plasma jet effluent is distributed.

To be sure that the absorption signal is only due to the ozone molecules the wavelength dependency of the line of sight optical depth τ was measured. Comparison of the results with literature shows a good agreement with the spectral absorption profile of ozone.

From the measurements of the optical depth result a high spatial resolution three dimensional map of the ozone densities, see figure 1. This study shows that the ozone density decreases rapidly with the distance in axial and radial direction from the nozzle.

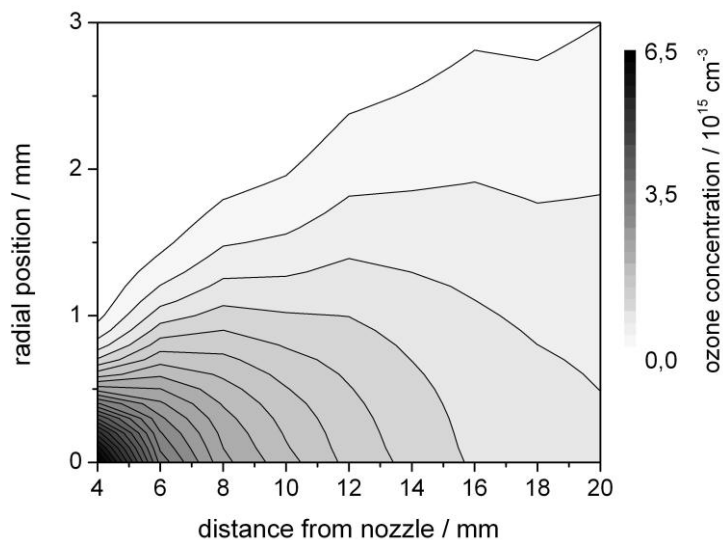


Figure 1: Map of the space resolved ozone density distribution. The plasma jet nozzle is located at 0 mm distance from nozzle [1].

References

- [1] S. Reuter et al., "Detection of Ozone in a MHz Argon Plasma Bullet Jet", PSST Special Issue Plasma Jets and Bullets (submitted)