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Diagnostic of plasma jet by mid-IR absorption spectroscopy with quantum cascade laser[1] SYLVAIN ISENI, MARIO DUENNBIER, JOERN WINTER, ZIK plasmatis at the INP Greifswald e.V., KLAUS-DIETER WELTMANN, INP Greifswald e.V., STEPHAN REUTER, ZIK plasmatis at the INP Greifswald e.V. — The interest in plasma jets operating at atmospheric pressure have considerably grown during the last decade. The non-equilibrium properties of the discharge enhances specific and interesting chemistry especially that of reactive nitric-oxide species (RNOS) such as O_3 or NO. It is already known that for instance O_3 has biological effects and have been used for sterilization of non-living objects. Thus, in order to investigate and control the biological reactive species produced by the jet, very accurate techniques are required. By using absorption spectroscopy in the mid-infrared range with quantum cascade laser, we were able to measure very accurate absolute production rates. The spectral range is restricted to the so-called fingerprint area (500-1500 cm^{-1}). Many approaches have been made to overcome the spectroscopic problems of the pressure broadening. One of those consists of simulating the spectrum online and then calculates the concentration by fitting the measurement with the simulation. We can assume an accuracy of 200 ppb with a lowest detection limit of 300 ppb. The diagnostic of O_3 is led on a MHz radiofrequency plasma jet operating with argon. The O_3 production is also compared regarding different admixtures such as O_2, N_2 or H_2O and surrounding atmosphere.

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