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Plasma properties of DC silicon based micro hollow cavity discharge (MHCD) operating in various gases - a spectroscopic study[1]
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Taking advantage of MEMS fabrication technologies, silicon (Si) based MHCD allow reducing significantly the electrode gap (8μm SiO_2 layer) and the cavity size (50 to 200μm diameter, 30μm depth). Operated in DC at pressure ranges from 10^4 to 10^5Pa, the plasma ignites in the cavity and operates in the normal or abnormal regime. Although Si-based MHCD operating in DC used to suffer from their short lifetime, recent advances on the design allow for extending their lifetime [1]. This study focuses on the measurement of the gas temperature in and out the cavity by means of space resolved optical emission spectroscopy. Two approaches are applied depending on the gas mixture (He, Ar, N_2, O_2, H_2O): either by studying the profile of resonant atomic lines or with the determination of the N_2(C-B) rotational temperature. Limitations of the latter approach will be discussed specifically. In addition, the electron density and the electric field value within the cavity have been investigated. [1] R. Michaud et. al., PSST, 27, 025005 (2018).

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