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Electron temperature of an RF discharge in argon up to atmospheric pressure ANTOINE DUROCHER-JEAN, Departement de physique, Universite de Montreal, Montreal, Canada, JEAN-SEBASTIEN BOISVERT, Institut national de la recherche scientifique, Varenne, Canada, JOELLE MARGOT, LUC STAFFORD, Departement de physique, Universite de Montreal, Montreal, Canada — A cold argon plasma is generated inside a dielectric tube (inner diameter of 2 mm) using two long linear electrodes painted on diametrically opposed sides of the tube. The optical emission spectra from Ar 4p-to-4s transitions were compared to the predictions of a collisional-radiative model using the electron temperature T_e (assuming a Maxwellian EEDF) and the Ar $1s_2$ level number density as the only adjustable parameters. T_e was deduced from the best fit between measured and simulated line emission intensities. At 760 Torr, the best fit is obtained for T_e=1.28 eV. When the power density increases from 4.2 to 7.0 W cm^{-3}, T_e remains constant while n_e (estimated from electrical measurements) increases from 3.7 to 8.8×10^{11} cm^{-3}. In this range of power density, the discharge remains in the Ω mode with a maximum of the light emission (dominated by a continuum in the UV-VIS range) at the center of the tube. By reducing the pressure to 90 Torr, the best fit is achieved for a higher T_e of 1.50 eV. On the other hand, the power density, n_e and the continuum intensity decrease with decreasing pressure. In contrast with a helium discharge in the same range of discharge current, the argon discharge does not switch to the γ mode.

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