Abstract Submitted
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Student Excellence Award Finalist: Absorption and absolute emission spectroscopy of RF-driven glow discharges at atmospheric pressure.[1] GAURAV NAYAK, MARIEN SIMENI SIMENI, PETER BRUGGEMAN, Department of Mechanical Engineering, University of Minnesota, USA, NADER SADEGHI, LIPhy (URA5588) & LTM (URA5129) Université Grenoble-Alpes & CNRS, Grenoble, France — RF-driven atmospheric pressure plasmas in argon and helium are of particular interests due to the production of highly excited and reactive species enabling numerous applications. Due to their long lifetimes, the atoms and molecules in the excited states of Ar and He are excellent reservoir of energy. In this contribution, broadband absorption spectroscopy is employed for the first time to measure the absolute densities of Ar atoms in metastable and resonant states, as well as the absolute densities of He atom and dimer metastables in a RF-driven capacitively coupled glow discharge at atmospheric pressure. The density profiles of these species across the plasma gap correlate well with the sheath structure of the plasma operated in the α-mode. The electron temperature and density in both discharges are also determined by fitting the measured absolute emission spectra with the neutral bremsstrahlung radiation. This study provides the first detailed analysis of all key parameters including gas and electron temperatures, and densities of electronically excited species in metastable and resonant states.

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