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Quantification of the VUV radiation in low pressure hydrogen and nitrogen plasmas URSEL FANTZ, Max-Planck-Institut fuer Plasmaphysik, STEFAN BRIEFI, Universitaet Augsburg, DAVID RAUNER, DIRK WUENDERLICH, Max-Planck-Institut fuer Plasmaphysik — Low pressure plasmas with hydrogen and/or nitrogen emit intense radiation in a broad wavelength region in the VUV. In order to quantify this radiation measurements in the wavelength region from 120 nm to 280 nm have been carried out using RF discharges. In case of molecular hydrogen dominant transitions are the Werner band (C–X), the Lyman band (B–X), and the continuum (a–b) as well as the Lyman lines from the hydrogen atom. Depending on the pressure, for hydrogen up to 20% of the RF power of 600 W, is found in the VUV, whereas only about 2% are emitted in the VIS represented by the Balmer series emission (H_α - H_ε) and the Fulcher emission (d–a). For nitrogen, the Lyman-Birge-Hopfield system (a-X) is most prominent in the wavelength region between 125 nm and 230 nm as well as some nitrogen resonance lines whereas in the visible range the first and second positive systems dominate. In hydrogen-nitrogen mixtures NH radiation appears due to the plasma chemistry. The measured radiant power will be compared with results from collisional radiative models for H_2 and N_2 which make use of electron density and temperature from spectroscopic measurements. Extrapolations to a wider parameter range are provided.

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