INVESTIGATION OF OPTOGALVANIC WAVEFORMS OF NEON AND ARGON UV TRANSITIONS FOR IDENTIFICATION OF THE PRIMARY ELECTRON COLLISIONAL IONIZATION PROCESS IN A HOLLOW CATHODE DISCHARGE

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Laser-induced optogalvanic (OG) waveforms of neon (301.735 nm) and arg on (320.366 nm) transitions in the UV region excited in commercial hollow cathode lamps at different currents were analyzed in order to identify and quantitatively characterize the dominant physical process contributing to the production of the optogalvanic signal. A rate equation model involving two or more states involved in the optical transitions was used to fit the observed waveforms. Effective decay rates of the states involved in the neon $1s_4$ - $4p_8$ (in Paschen notation) and argon $1s_3$ - $6p_5$ transitions, along with the associated amplitudes and instrumental time constants were determined using a non-linear least-squares fit of the observed data. Based on the present calculations, we conclude that the electron collisional ionization process is the main determining factor for the OG signal at 301.735 nm for neon and that of argon at 320.366 nm.

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