A Comparison of the Nonlinear Least-Squares Fitting and Analysis of the 633.4-nm ($1s_5 - 2p_8$) and 638.3-nm ($1s_4 - 2p_7$) Optogalvanic Spectral Transitions of Neon[1] KAYODE OGUNGBEMI, PRABHAKAR MISRA, Howard University — OG transitions of neon excited in an Iron-neon lamp when illuminated with a Nd: YAG-pumped pulsed dye laser have been investigated, specifically the $1s_5$ – $2p_8$ and $1s_4$– $2p_7$ transitions of neon as a function of discharge conditions (0.50-2.00 mA, 5 Torr). The OG waveforms recorded were analyzed using a theoretical model. Monte Carlo least-squares fitting of these waveforms has helped to specifically determine the exponential rates and time constant parameters associated with the evolution of the OG signals. The amplitudes and shapes of these waveforms have been studied as a function of current, and also the effects of collision rates experienced by the neon atoms in the modeling of the cathode plasma. A comparison of the $1s_5$– $2p_8$and $1s_4$– $2p_7$OG transitions of neon provides insight into population distribution and the nature of the collisions occurring in the sustained discharge of the hollow cathode lamp.

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