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Spectroscopic studies of the 1^{st} and 2^{nd} continuum emission bands (λ=74-90nm) from decaying Ne_2* excimers generated in high pressure dielectric barrier discharge plasmas ROBERT CARMAN, DEBORAH KANE, Macquarie University — For gas pressures above >100mbar, the radiative decay of Ne_2* excimer molecules gives rise to strong emission in the vacuum-ultraviolet corresponding to the partially overlapping 1^{st} and 2^{nd} continuum excimer bands λ ~74-90nm [1]. We have evaluated the λ-dependence of the spectral emission from ~700 individual ro-vibrational states of the Ne_2^* $0_u^+(^3P_1)$ and Ne_2^* $1_u(^3P_2)$ excited bound states. Energy levels and corresponding wavefunctions were calculated from the code LEVEL 8.0 of LeRoy [2], based on known potential energy curves [3]. Comparison between the calculated spectra and experimental data allows the individual contributions from the overlapping 1^{st} and 2^{nd} bands to be clearly resolved. Detailed analysis of the 1^{st} continuum output gives insight into the magnitude of the buffer gas induced relaxation rates involving the twelve vibrational states of Ne_2* $0_u^+(^3P_1)$. Our results also suggest the potential energy curves for $0_u^+(^3P_1)/1_u(^3P_2)$ in [3] should be revised with D_e values reduced by ~25%. [1] R Carman et-al J Phys D **43** 025205 (2010), [2] R J Le Roy, University of Waterloo Chemical Physics Research Report CP-663 (2007); see http://leroy.uwaterloo.ca/programs/ [3] F Grein et-al, J Chem Phys **87** 4684 (1987)

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