FOURIER-TRANSFORM SPECTROSCOPY OF I_2 (D-X) EMISSION FOLLOWING OPTICAL-OPTICAL DOUBLE RESONANCE EXCITATION OF THE I_2 (E) STATE

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The $E\ 0_g^+$ ion-pair state of I_2 molecule may be excited by the optical-optical double resonance (OODR) via the valence state $B\ 0_u^+$, $I_2(X\ 0_g^+) + h\nu_1 \rightarrow I_2\ (B\ 0_u^+\ ) + h\nu_2 \rightarrow I_2\ (\ E\ 0_g^+\ )$.

Emission spectra of pure I_2 vapor selectively excited in this way show not only ransitions from the $E\ 0_g^+$ state, but also $D\ 0_u^+ \rightarrow X\ 0_g^+$ transition in the near ultraviolet. Typically the populated levels in the $D\ 0_u^+$ state are located less than $300\ cm^{-1}$ below the laser-excited level. In this contribution we examine rotationally resolved Fourier-transform spectra of the $D\ 0_u^+ \rightarrow X\ 0_g^+$ emission following OODR excitation of various $E\ 0_g^+\ v, J$ levels with single mode cw dye lasers. We show that the $E\ 0_g^+ \rightarrow D\ 0_u^+$ population transfer obeys the J_D=J_E $\pm$ 1, 3, 5 ... propensity rule. Transfer to the J_D=J_E $\pm$1 levels is the most probable although in some cases, J_D=J_E-1 and J_D=J_E+1 have significantly different populations.