

AN OPTICAL-OPTICAL DOUBLE-RESONANCE SPECTROSCOPIC STUDY OF FOUR ION-PAIR STATES OF CLF AND IDENTIFICATION OF THE CLF(*A*) VALENCE STATE

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Four ion-pair states of ClF,  $E\ 0^+(^3P_2)$ ,  $f\ 0^+(^3P_0)$ ,  $\beta\ 1(^3P_2)$  and  $G\ 1(^3P_1)$ , have been identified by sequential excitation via the  $B\ ^3\Pi_{0+}$  valence state. Excitation spectra and fluorescence spectra have been acquired, which permit the assignment of vibrational energies and rotational constants to 31 levels. These four ion-pair states exhibit complex homogeneous and heterogeneous interactions and neither the vibrational nor rotational constants are regular with increasing vibrational quantum number. The vibrational and rotational constants of the  $A\ ^3\Pi_1$  state were identified from the low resolution  $\beta - A$  emission spectra and the dissociation limits of ClF ( $B\ ^3\Pi_{0+}$ ) and ClF( $A\ ^3\Pi_1$ ) are discussed. The dissociation energy of ClF ( $X$ ) is confirmed to be  $21110\ \text{cm}^{-1}$ . Some qualitative information also was obtained about the  $D'\ 2(^3P_2)$  and  $A'\ ^3\Pi_2$  states.

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