

RYDBERG STATES OF CALCIUM MONOCHLORIDE

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Experimental results from our continuing study of the Rydberg states of Calcium Monochloride will be presented. Previously we have characterized the quantum defects and predissociation mechanisms of core-penetrating $^2\Sigma^+$ states of CaCl in the $n^* = 3-7$ region.^a,
^b Questions unanswered by this work propelled further studies of the low- n^* region ($n^* = 3-5$) by REMPI and ion-dip techniques, as this region is expected to be extensively predissociated by $^2\Sigma^+$ and $^2\Pi$ repulsive states. Interest in high- n^* ($n^* > 15$) Rydberg states of CaCl has also fueled further REMPI experiments near the first ionization threshold ($48\,491\text{ cm}^{-1}$). Studies of the low- n^* region failed to reveal several predicted members of known core-penetrating $^2\Sigma^+$ Rydberg series ($n^* = 0.16, 0.49, 0.68\ ^2\Sigma^+$ and $0.30\ ^2\Pi$), while preliminary data for the high- n^* region above the $v^+ = 0$ IP indicate the presence of vibrationally autoionizing Rydberg states converging to $v^+ > 0$ vibrational levels of the CaCl⁺ ion X $^1\Sigma^+$ state. Analysis is ongoing.

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