AUTOIONIZING STATES OF CALCIUM MONOFLUORIDE

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We will report experimental results from the pulsed optical-optical double resonance study of Calcium Monofluoride(CaF). These spectra are recorded via D $^2\Sigma^+$ state of CaF in the autoionization region above v^+=0 ionization potential with n*=15 $\sim$ 45. Compared to the OODR spectra of CaCl obtained previously in the same region, more $^2\Sigma^+$ and $^2\Pi$ states are assigned for CaF. This can be explained by the predissociation of CaCl. In this autoionization region the disappearance or shift of some members of the predicted CaF core-penetrating series reveals the existence of perturbation between certain states, which is not the case for CaCl. The OODR spectra of CaF in the high-n* region indicate that the vibrationally autoionizing states of CaF converge to $v^+ > 0$ vibrational levels of CaF^+ ion. This work completes previous studies of CaF by exploiting different intermediate states, e.g. the reverse-polarized C $^2\Pi$ state, to investigate the vibrational constant ω_e for each Rydberg series and the corresponding quantum defect derivative with respect to the internuclear distance R^+, which controls the autoionization process.