CaF: ALL SPECTRA AND ALL DYNAMICS

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More than 1,000 CaF rovibronic levels, spanning the range $n^* = 5,\ v = 0\ (42,500\ \text{cm}^{-1})$ to $n^* = 20,\ v = 1\ (47,500\ \text{cm}^{-1})$, and sampling $\ell = 0(s) - 5(h)$ are fitted to a quantum defect model. This model consists of two currently separate pieces: the core-penetrating $s,\ p,\ d,\ f$ series are fitted to the elements of an internuclear distance (R) and energy (E) dependent quantum defect matrix, $\mu(R, E)$; the core-nonpenetrating series are described by multipole $(\mu,\ Q,\ O)$ moments and polarizabilities $(\alpha,\ \gamma)$. The values of the fitted parameters agree well with $ab\ initio$ computed values. Although the fitted parameters permit calculation of all spectra and all dynamics of CaF, the physical meanings of the parameters remain obscure.