

Abstract Submitted
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Microwave spectroscopy of the calcium $4snf \rightarrow 4s(n+1)d$, $4sng$, $4snh$, $4sni$, and $4snk$ transitions¹ JIRAKAN NUNKAEW, Chiang Mai University, TOM GALLAGHER, University of Virginia — We use a delayed field ionization technique to observe the microwave transitions of calcium Rydberg states, from the $4snf$ states to the $4s(n+1)d$, $4sng$, $4snh$, $4sni$, and $4snk$ states for $18 \leq n \leq 23$. We analyze the observed intervals between the ℓ and $(\ell+1)$, $\ell \geq 5$, states of the same n to determine the Ca^+ $4s$ dipole and quadrupole polarizabilities. We show that the adiabatic core polarization model is not adequate to extract the Ca^+ $4s$ dipole and quadrupole polarizabilities and a non adiabatic treatment is required. We use the non adiabatic core polarization model to determine the ionic dipole and quadrupole polarizabilities to be $\alpha_d = 76.9(3) \text{ a}_0^3$ and $\alpha_q = 206(9) \text{ a}_0^5$, respectively.

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