MICROWAVE SPECTROSCOPY OF BARIUM $5d_{3/2}$nℓ AUTOIONIZING STATES

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We have observed microwave resonance transitions between the autoionizing Ba $5d_{3/2}ng$ $J = 2$ and $5d_{3/2}(n+1)h$ $J = 3$ states for $45 \leq n \leq 49$. These measurements, made between 50 and 75 GHz, lead to quantum defects of +0.019(2) and +0.003(2) for this pair of ng and nh states. These measurements demonstrate that the core polarization model, widely used to characterize non penetrating Rydberg states, fails to describe Rydberg states converging to anisotropic or non s cores. We believe that this is the first time spectroscopy of autoionizing states using microwaves has been performed.