

Abstract Submitted
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Utilizing Doubly Excited States of Barium for Quantum Computation and Improved Quantum Control¹ JOHN PAPAIOANNOU, CHRIS H. GREENE, JILA — The existence of doubly excited perturbers in the alkali-earth atoms provides a rich spectrum of states with possible applications for quantum information storage. Using the framework of multichannel quantum defect theory, the bound state spectra with total angular momenta up to $J=5$ were calculated. Due to configuration mixing, these doubly excited perturbers can have significant Rydberg character to their wavefunctions. By tuning electric fields it is possible to induce transitions between perturbers and excited Rydberg states with higher orbital angular momenta. This not only allows the possibility of improved control in exciting to high- l Rydberg states but may also be utilized as possible qubit candidates.

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