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Utilizing doubly excited states of barium for quantum information storage[1] JOHN PAPAIOANNOU, CHRIS H. GREENE, Department of Physics and JILA, University of Colorado, Boulder, Colorado 80309-0440, USA — The existence of doubly excited perturbers in the alkaline-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 even-parity J = 2 spectrum of Ba were studied, which have 5d7d doubly excited states embedded in the 6snd $^1D_2$ and 6snd $^3D_2$ Rydberg series. Due to configuration mixing, an external electric field can induce transitions to quasi-degenerate Rydberg states in odd-parity neighboring symmetries. 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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John Papaioannou
Department of Physics and JILA, University of Colorado,
Boulder, Colorado 80309-0440, USA

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