

Abstract Submitted
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Asymmetric blockade and multi-qubit gates via dipole-dipole interactions JEREMY YOUNG, PRZEMEK BIENIAS, RON BELYANSKY, Joint Quantum Institute, ADAM KAUFMAN, JILA, University of Colorado Boulder, ALEXEY GORSHKOV, Joint Quantum Institute — Due to their long-range nature, dipole-dipole interactions in polar molecules and Rydberg atoms provide a versatile tool that can provide dramatic speedups in a variety of quantum computation protocols. In this talk, I will discuss how by dressing multiple Rydberg states, asymmetric blockade can be achieved via dipole-dipole interactions. I will then show how the resultant asymmetric blockade can be used to engineer multi-qubit control gates in which there are multiple control qubits and multiple target qubits.

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