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Adiabatic Quantum Computation with Neutral Atoms[1]

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We are implementing a new platform for adiabatic quantum computation (AQC)[2] based on trapped neutral atoms whose coupling is mediated by the dipole-dipole interactions of Rydberg states. Ground state cesium atoms are dressed by laser fields in a manner conditional on the Rydberg blockade mechanism,[3,4] thereby providing the requisite entangling interactions. As a benchmark we study a Quadratic Unconstrained Binary Optimization (QUBO) problem whose solution is found in the ground state spin configuration of an Ising-like model.

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[3]S. Rolston, et al. Phys. Rev. A, **82**, 033412 (2010)

[4]T. Keating, et al. arXiv:1209.4112 (2012)