Quantum computing of NP problems with Rydberg-atom graphs

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Currently there are growing interests in using Rydberg atom graphs for quantum computing of classically intractable problems, for example, the non-deterministic polynomial-time (NP) problems. It has been identified some NP problems are easily implementable with intrinsic Hamiltonians of interacting Rydberg atoms, of which atom arrangements define the problems in such a way that their solutions are compilable from the ground states of the Rydberg many-body Hamiltonians [1]. In the talk, we first review our recent Rydberg-atom experiments performed for the Maximum Independent Set (MIS) of planar and nonplanar graphs implemented with atoms used as data qubits and quantum wires [2,3], and then we discuss experimental efforts towards other NP and NP-complete problems such as the 3-Satisfiability [4] and prime-number factorization problems.

References:
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