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JOURNAL CLUB | Star-topology Registers: NMR and Quantum Information Perspectives

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Blue Lecture Room

Quantum control of large spin registers is crucial for many applications ranging from spectroscopy to quantum information. A key factor that determines the efficiency of a register for implementing a given information processing task is its network topology. One particular type, called star-topology, involves a central qubit uniformly interacting with a set of ancillary qubits. A particular advantage of the star-topology quantum registers is in the efficient preparation of large entangled states, called NOON states, and their generalized variants. Thanks to the robust generation of such correlated states, spectral simplicity, ease of polarization transfer from ancillary qubits to the central qubit, as well as the availability of large spin-clusters, the star-topology registers have been utilized for several interesting applications over the last few years. Here we review some recent progress with the star-topology registers, particularly via nuclear magnetic resonance methods.

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