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Ground States as Resources for Universal Measurement-Based Quantum Computing[1] ADAM G. D'SOUZA, DAVID L. FEDER, University of Calgary — Measurement-based quantum computation (MBQC) requires a massively entangled resource state (such as a cluster state) as input. Experimental efforts towards generating such states have typically focused on performing global entangling operations on uncorrelated qubits. As the states that result from this type of procedure are not generally ground states, they are very sensitive to decoherence effects. A more robust resource would be one that is in fact a ground state of some Hamiltonian that exhibits a reasonably large energy gap between the ground state and the various excited states. We will discuss the possibility of finding simple two-body spin Hamiltonians whose ground states are equivalent to resource states for MBQC under stochastic protocols comprised solely of local operations and classical communication.

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Adam G. D'Souza
University of Calgary

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