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Simulating Concordant Computations BRYAN EASTIN, Northrop Grumman — A quantum state is called concordant if it has zero quantum discord with respect to any part. By extension, a concordant computation is one such that the state of the computer, at each time step, is concordant. In this talk, I describe a classical algorithm that, given a product state as input, permits the efficient simulation of any concordant quantum computation having a conventional form and composed of gates acting on two or fewer qubits. This shows that such a quantum computation must generate quantum discord if it is to efficiently solve a problem that requires super-polynomial time classically. While I employ the restriction to two-qubit gates sparingly, a crucial component of the simulation algorithm appears not to be extensible to gates acting on higher-dimensional systems.

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