Abstract Submitted
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Hidden Variables Theorems with Fewer Measurements JAY LAWRENCE, Dartmouth College and University of Chicago — A Greenberger-Horne-Zeilinger (GHZ) contradiction may be thought of as a sequence of measurements on a system of N particles, for which each may be duplicated by local hidden variables up to, but not including the last of an irreducible set. Each measurement consists of N spatially separated local measurements on individual particles. Existing contradictions require more such measurements than there are particles, the minimum number being $N + 1$. By allowing successive measurements to impose incremental local constraints on the hidden variables (as opposed to global constraints associated with products of hidden variables), we derive contradictions that require fewer measurements. We have found protocols for which the number of measurements, N_m, grows more slowly than linearly with the number of particles: Asymptotically, $N_m \sim \sqrt{2N}$ for large N if the particles are qubits, and a similar relation holds for particles of higher spins.

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