1139-81-218 **Zhengfeng Ji** and **Debbie Leung*** (wcleung@uwaterloo.ca), Dept of Combinatorics and Optimization, University of Waterloo, Waterloo, Ontario N2L3G1, Canada, and **Thomas Vidick**.

A nonlocal game that cannot be played optimally using a finite amount of entanglement.

We introduce a three-player nonlocal game, with a finite number of classical questions and answers, such that the optimal success probability of 1 in the game can only be achieved in the limit of strategies using arbitrarily high-dimensional entangled states. Precisely, there exists a constant $0 < c \leq 1$ such that to succeed with probability $1 - \epsilon$ in the game it is necessary to use an entangled state of at least $\Omega(\epsilon^{-c})$ qubits, and it is sufficient to use a state of at most $O(\epsilon^{-1})$ qubits. The game is based on embezzlement of entanglement.

Nonlocal games are equivalent to Bell inequalities, where the questions become measurement settings, answers become measurement outcomes, and the success probability is related to special correlations in the measurement outcomes. (Received February 12, 2018)