

Abstract Submitted
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Identifying Topological Order in the Shastry-Sutherland Model via Entanglement Entropy DAVID RONQUILLO, MICHAEL PETERSON, Cal State Univ- Long Beach — It is known that for a topologically ordered state the area law for the entanglement entropy shows a negative universal additive constant contribution, $-\gamma$, called the topological entanglement entropy. We theoretically study the entanglement entropy of the two-dimensional Shastry-Sutherland quantum antiferromagnet using exact diagonalization on clusters of 16 and 24 spins. By utilizing the Kitaev-Preskill construction [A. Kitaev and J. Preskill, Phys. Rev. Lett. 96, 110404 (2006)] we extract a finite topological term, $-\gamma$, in the region of bond-strength parameter space corresponding to high geometrical frustration. Thus, we provide strong evidence for the existence of an exotic topologically ordered state and shed light on the nature of this model's strongly frustrated, and long controversial, intermediate phase.

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