Thermodynamics of the 2D $S = 1/2$ Shastry–Sutherland model and \( \text{SrCu}_2(\text{BO}_3)_2 \)

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Reliable computation of the low-temperature thermodynamic properties of highly frustrated quantum magnets is on the one hand highly relevant for experiments, but on the other hand a considerable challenge since, e.g., conventional Quantum-Monte-Carlo (QMC) simulations suffer from a severe minus sign problem. \( \text{SrCu}_2(\text{BO}_3)_2 \) is famous for its rich physical properties and as a realization of the two-dimensional spin-$1/2$ Shastry–Sutherland model. Notwithstanding recent progress with QMC simulations in the dimer basis, the parameter regime relevant to \( \text{SrCu}_2(\text{BO}_3)_2 \) has remained inaccessible $[1]$. Here we present accurate results obtained from two other methods, namely Thermal Pure Quantum (TPQ) states and infinite Projected Entangled Pair States (iPEPS). We observe the emergence of a low-temperature peak in the specific heat $C$ and relate it to the large number of bound states that emerge close to the first-order transition from the dimer to the plaquette phase.