Detecting Elusive Phase Transitions with Geometric Entanglement

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We show that by looking at the density of global geometric entanglement it is possible to identify "elusive" or hard to detect phase transitions. We do this by analyzing several one-dimensional (1D) quantum spin chains, and showing the existence of non-analyticities in the global geometric entanglement across a Kosterlitz-Thouless (KT) transition and across a transition for a gapped deformed AKLT chain. The observed non-analyticities are in sharp contrast to the analytic behavior of all the two-body reduced density operators and their derived entanglement measures.

Joint work with Roman Orus.