

Abstract Submitted
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Entanglement and Quantum Phase Transition Revisited YANG

MIN-FONG, Physics Department, Tunghai University, Taiwan — We show that, for an exactly solvable quantum spin model, a discontinuity in the first derivative of the ground state concurrence appears in the absence of quantum phase transition. It is opposed to the popular belief that the non-analyticity property of entanglement (ground state concurrence) can be used to determine quantum phase transitions. We further point out that the analyticity property of the ground state concurrence in general can be more intricate than that of the ground state energy. Thus there is no one-to-one correspondence between quantum phase transitions and the non-analyticity property of the concurrence. Moreover, we show that the von Neumann entropy, as another measure of entanglement, can not reveal quantum phase transition in the present model. Therefore, in order to link with quantum phase transitions, some other measures of entanglement are needed.

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