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**New indicators of quantum phase transitions in several exactly solvable critical systems** FERDI ALTINTAS, RESUL ERYIGIT, Department of Physics, Abant Izzet Baysal University, Bolu, Turkey — Quantum phase transitions (QPT) are the abrupt changes of the ground state of quantum systems as a consequence of a continuous change of a tuning parameter (an external field or an anisotropy parameter). They are solely because of quantum fluctuations and occur at absolute zero temperature. The quantumness measures, such as entanglement and quantum discord (QD), are shown to be promising indicators of QPTs. In this presentation, we will introduce new indicators, such as Bell nonlocality as revealed by the violation of CHSH inequality and measurement induced disturbance (MID), for characterizing quantum phase transitions in several exactly solvable critical systems, discuss their usefulness in capturing QPTs and compare the performance of these measures with that of the well known QPT-detectors. We have shown that although entanglement, QD and MID can partially indicate the QPTS (mostly model dependent), CHSH-Bell inequality can detect all QPTs of the considered models even when the relevant ground state is uncorrelated.

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