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Hidden Space-times in Quantum Spin Chains

Friday, 21 February 2020 10:30 (30 minutes)

It has been suggested that space-time geometries can emerge from quantum entanglement in the context of AdS/CFT and beyond. Inspired by travel-time tomography in seismology, we construct a geometry detector that quantitatively determines whether classical space-times can actually emerge from certain entanglement patterns. Then we explicitly reconstruct the best-fit emergent holographic geometries from various entanglement data extracted from a 1-dimensional quantum system, such as a quantum spin chain at criticality, for both static and dynamical cases. Finally, we discuss how this approach may be used for understanding simulated classical/quantum gravitational dynamics in a laboratory setting.

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Session Classification: Morning session