



Mathematics and CS Seminar

Horizon violation and dynamical generation of infinite-range correlations after a quantum quench

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One of the fundamental principles of relativity is that a physical observable at any spacetime point is determined only by events within its past light-cone. In non-equilibrium quantum field theory this is manifested in the way correlations spread through spacetime: starting from an initially short-range correlated state, measurements of two observers at distant spacetime points are expected to remain independent until their past light-cones overlap. This is usually called the horizon effect. In contrast to this typical behaviour we find that when topological excitations are present, correlations develop outside of the horizon even between infinitely distant points. We demonstrate this effect in the sine-Gordon model, showing that it can be attributed to the non-local nature of solitons and interpreted as dynamical generation of entanglement between distant regions of space. Our results are derived by means of two independent methods: a numerical technique based on Renormalisation Group and Conformal Field Theory and an exact analytical calculation based on Bosonisation, the simplest example of Duality in quantum field theory.

Thursday, September 5, 2019 04:00pm - 06:00pm

Heinzel Seminar Room / Office Bldg West (I21.EG.101)



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