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## An Area Law for Entanglement Entropy in Particle Scattering

Thursday 16 May 2024 17:00 (15 minutes)

We show in a very general setup that the linear entropy for the entanglement of a final state, resulting from a quantum 2 to 2 scattering of unentangled initial states in the plane wave limit, is twice of the scattering probability for certain outcomes. In particular, the entropy can be expressed as proportional to some scattering cross section, divided by an area that characterizes the spread of the initial wave function in the transverse directions of the position space. The result does not require the weak coupling limit and is to all orders in coupling strength; the computation requires a careful wave packet formulation of the initial states, though the results are independent of the details of the wave packets as long as the initial states are sufficiently close to momentum eigenstates. Furthermore, different ways to bipartite the system of the final state results in entropy that depends on the cross sections of different scattering outcomes.

## Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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