

Quantum entanglement in the QCD vacuum

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I will discuss the prospects of using quantum information concepts to study dynamical chiral symmetry breaking (DCSB) features in quantum chromodynamics (QCD). First, I will present a formalism based on the coherent state representation of Fock-space to construct an ansatz for QCD vacuum state in the Coulomb gauge. Next, I will show how one can define entanglement measures over partitions of the Fock space. Finally, I will present detailed results, obtained within a model Hamiltonian inspired by the QCD Hamiltonian in the Coulomb gauge, for the entanglement entropy associated with the momentum-correlated quark-antiquark pairs in the DCSB vacuum. I conclude with a brief overview of QCD's current and envisaged uses of quantum information science ideas and methods.