Harnessing gauge fields for maximally entangled state generation
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— We study the generation of entanglement between two species of bosons living
on a ring lattice, where each group of particles can be described by a d-dimensional
Hilbert space (qudit). Gauge fields are exploited to create an entangled state be-
tween the pair of qudits. Maximally entangled eigenstates are found for well-defined
values of the Aharonov-Bohm phase, which are zero-energy eigenstates of both the
kinetic and interacting parts of the Bose-Hubbard Hamiltonian, making them quite
exceptional. We propose a protocol to reach the maximally entangled state (MES)
by starting from an initially prepared ground state. Also, an indirect method to
detect the MES by measuring the current of the particles is proposed.

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