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Generating coherent states of entangled spins[1] HONGYI YU, YU LUO, WANG YAO, Department of Physics and Center of Theoretical and Computational Physics, The University of Hong Kong, Hong Kong, China — A coherent state of many spins contains quantum entanglement, which increases with the decrease of the collective spin value. We present a scheme to engineer this class of pure state based on incoherent spin pumping with several collective raising and lowering operators. In a pumping scenario aimed for maximum entanglement, the N-qubit steady state realizes the ideal resource for the $1 \to N/2$ quantum telecloning. We show how the scheme can be implemented in the cold atomic system in an optical lattice. Error analysis shows that high-fidelity state engineering is possible for $N \sim O(100)$ spins in the presence of decoherence. The scheme can also prepare the large-scale Affleck-Kennedy-Lieb-Tasaki state.

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