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# Controlled Coherent Quantum Tunneling of Atomic Ensembles

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Abstract: We investigate the coherent tunneling phenomenon of the laser-driven atomic ensembles confined in a well-separated double-well potential. By generalizing the Frohlich canonical transformation to adiabatically eliminate the light field variable, a BCS-like effective Hamiltonian is obtained to depict the residual interaction between the two atomic ensembles. The number of the tunneling collective low excitations and its relationship to the ratios $g_r/g_l$ and $N_r/N_l$ are given.

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