

# INSEPARABLE TWO-QUBIT STATES via PHONON RESERVOIR

*Thursday 10 July 2025 19:00 (15 minutes)*

Here, we demonstrate the feasibilities to create inseparable quantum states among laser pumped pairs of two-level quantum dots embedded in a semiconductor substrate. The laser wave-vector is being normal to the line connecting the qubits, while the two-level emitters interact with both the environmental electromagnetic field reservoir as well as the phonon's thermostat. Surprisingly, we have found that the entanglement between the qubit's subsystem components significantly enhances due to the environmental phonon reservoir. This occurs because phonons open an additional decay channel that facilitates the entanglement creation [1].

Particularly, Figure 1 shows the concurrence  $C$  [2,3] which characterizes the entanglement among the qubit pair in the presence of phonons. Larger values for the concurrence are due to phonon population of the anti-symmetrical two-qubit cooperative state [1].

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