



Quantum Physics

# Entanglement in Coupled Harmonic Oscillators via Unitary Transformation

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We develop an approach to study the entanglement in two coupled harmonic oscillators. We start by introducing an unitary transformation to end up with the solutions of the energy spectrum. These are used to construct the corresponding coherent states through the standard way. To evaluate the degree of the entanglement between the obtained states, we calculate the purity function in terms of the coherent and number states, separately. The result is yielded to two parameters dependance of the purity, which can be controlled easily. Interesting results are derived by fixing the mixing angle of such transformation as  $\pi/2$ . We compare our results with already published work and point out the relevance of these findings to a systematic formulation of the entanglement effect in two coupled harmonic oscillators.

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