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Coherent Interaction of Spins Induced by Thermal Bosonic Environment. DENIS TOLKUNOV, DMITRY SOLENOV, VLADIMIR PRIVMAN, Clarkson University — We obtain the indirect exchange interaction between two two-state systems, e.g., spins, in a formulation that also incorporates the quantum noise that they experience, due to an environment of bosonic modes, for instance, phonons. We predict that for low enough temperatures the interaction is coherent over time scales sufficient to create entanglement, dominated by the zero-point quantum fluctuations of the environment. We utilize a perturbative approach to obtain a quantum evolution equation for the two-spin dynamics. The induced interaction is calculated exactly. We identify the time scales for which the spins develop and sustain entanglement for various spatial separations.

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