

Abstract Submitted
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Title: Dynamics of Overhauser Field under nuclear spin diffusion in a quantum dot ZHE-XUAN GONG, ZHANG-QI YIN, LU-MING DUAN —
The coherence of electron spin can be significantly enhanced by locking the Overhauser field from nuclear spins using the nuclear spin preparation. We propose a theoretical model to calculate the long time dynamics of the Overhauser field under intrinsic nuclear spin diffusion in a quantum dot. We obtain a simplified diffusion equation that can be numerically solved and show quantitatively how the Knight shift and the electron-mediated nuclear spin flip-flop affect the nuclear spin diffusion. The results explain several recent experimental observations, where the decay time of Overhauser field is measured under different configurations, including variation of the external magnetic field, the electron spin configuration in a double dot, and the initial nuclear spin polarization rate.

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