

Spin Dynamics in a Random Hyperfine Field and Non-Hermitian 1D Anderson Model

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We study the time evolution of a spin of a carrier moving in a random hyperfine field. We demonstrate a formal similarity between the time evolution of spinors and of evolution of reflection coefficient along a 1D chain in the Anderson model. Therefore, the problem can be mapped onto a 1D Anderson model with a complex potential energy. With the help of this mapping we find the distribution of spin-projection as a function of time exactly. This distribution rapidly broadens with time and approaches the homogeneous distribution at large times. Analytical results are confirmed by the numerical simulations.