




Research articles

## Control and manipulation of quantum spin switching and spin correlations in $[Tb_2]$ molecular magnet under a pulse magnetic field

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### Abstract

A general study of  $[Tb_2]$  molecular magnet is presented using the general spin Hamiltonian formalism. Spin-spin correlators determined for a spin wave functions in  $[Tb_2]$  are analyzed numerically and compared in details with the results obtained by means of conventional quantum mechanics. It is shown that the various expectation values of the spin operators and a study of their corresponding probability distributions allow to have a novel understanding in spin dynamics of entangled qubits in quantum  $[Tb_2]$  system. The obtained results reveal that the properties of spin-spin correlators are responsible for the entanglement of the spin qubit under a pulse magnetic field. It allows us to present some quantum circuits determined for quantum computing within SSNQ based on  $[Tb_2]$  molecule, including the CNOT and SWAP gates.