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Spin oscillation generated by an acoustic wave in single-molecule magnets containing a nanoresonator GWANG-HEE KIM, Dept. of Physics, Sejong Univ., Seoul — We study the quantum beat of a tunneling spin coupled to a torsional resonator in the presence of an acoustic wave. When the oscillator frequency is large compared to the tunnel splitting, the system displays multiple transitions with macroscopic quantum beat structure during the field sweep. Entanglement of spin and mechanical angular momentum in the presence of a sound wave results in quantum beat as well as abrupt changes of oscillator dynamics, which coincide in time with spin transitions. We show that the size of the transition step in the torsional rotation angle is strongly affected by sound. We compare purely quantum and semiclassical dynamics of the system and discuss their experimental realizations.

Gwang-Hee Kim
Dept. of Physics, Sejong Univ., Seoul

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