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Multiphoton transient EPR nutations in a doubly resonant bichromatic field

Ryhor Fedaruk, Alexander P.Saiko, Sergey A.Markevich

We demonstrate theoretically and experimentally that multiplication of spin qubits arises at double resonance in a bichromatic field when the frequency of the radio-frequency field is close to that of the in the microwave field, provided its frequency equals the Larmor frequency of the initial qubit. The effect is investigated beyond the rotating wave approximation using transient nutations in the pulse EPR of E' centers in crystalline quartz. It is shown that the operational multiphoton transitions of qubits dressed by the bichromatic field can be selected by the choice of both the rotating frame and the radio-frequency phase.