

## Multiphoton Resonances in Pulse EPR

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### Abstract

Two- and three-photon electron spin echoes of a two-level system are observed using, in addition to the microwave excitation, a linearly polarized radio-frequency field oriented along the static magnetic field  $B_0$ . Such multiphoton echoes are detected when the sum of the energies of one microwave and one or two radio-frequency photons are equal to the difference between energies of two spin states. The multiphoton character of the echoes is confirmed by measuring the spin nutation frequency as a function of the angle between the radio-frequency field and  $B_0$ , and monitoring the echo amplitude as a function of the radiation field strengths. Floquet theory, usually applied for the description of multiphoton resonances with an odd number of photons, is extended to the case where an even number of photons participate in the transition. © 2000 Academic Press.

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### Keywords

Dressed states, Electron spin echo, Floquet theory, Multiphoton resonance, Pulse EPR