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Analytical description of spin-Rabi oscillation controlled electronic transitions rates between weakly coupled pairs of paramagnetic states with S=(1/2)[1] RACHEL GLENN, WILLIAM BAKER, CHRISTOPH BOEHME, MIKHAIL RAIKH, University of Utah — We study theoretically and experimentally the Fourier content, $\mathbf{F}(s)$, of the Rabi oscillations in photoconductivity coming from pairs of spin-$\frac{1}{2}$ localized carriers. Upon increasing the ac drive, the Fourier spectrum evolves from a single peak at $s = \Omega_R$, where Ω_R is the Rabi frequency, to *three* peaks at $s = \Omega_R$, $s = 2\Omega_R$, and at low $s \ll \Omega_R$. The crossover between the two regimes takes place when Ω_R exceeds the broadening, δ_0, of Zeeman levels due to disorder, e.g., hyperfine field. We capture this crossover within the analytical treatment by calculating the shapes of all three peaks at arbitrary relation between Ω_R and δ_0. When the peaks are well-developed their widths are $\Delta s \sim \delta_0^2/\Omega_R$. Good agreement of theory and experiment allowed us to infer the experimental value of δ_0.

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