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Spin-dependent carrier recombination on a silicon surface

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Variations were observed in the intrinsic photoconductivity of silicon for spin-resonance conditions at surface recombination centers. The ratio of the change in the photoconductivity under resonance conditions to the photoconductivity itself, $\delta\Delta\sigma/\Delta\sigma$, had values up to about 10^3 in our experiments. To account for this effect, a model is proposed which includes the exchange interaction between unpaired electrons at recombination centers. The quantity $\delta\Delta\sigma/\Delta\sigma$ is calculated as a function of various factors. Our model of spin-dependent recombination on the silicon surface gives a qualitatively correct description of the experimental results.

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