Ultrafast nonlinear response of silicon carbide to intense THz fields

We demonstrate ultrafast nonlinear absorption induced by strong, single-cycle THz fields in bulk, lightly doped 4H silicon carbide. A combination of Zener tunneling and intraband transitions makes the effect as at least as fast as the excitation pulse. The sub-picosecond recovery time makes the observed response the fastest nonlinear modulation scheme for THz signals reported so far.

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