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Ab-initio theory of pump-probe experiments ANDRAS VERNES, PETER WEINBERGER, CMS, TU Vienna, Austria — By linearizing the density of both the pump- and probe-excited states and neglecting the overlap between femtosecond laser pulses, the Kubo response theory is extended to describe pump-probe experiments in the visible optical regime. In this scheme second order responses are included, although it is formally a linear theory and therefore all obtained expressions can be implemented straightforwardly via a Green's function approach. In particular, already the time-dependent zeroth order dynamic conductivity as obtained by means of the spin-polarized relativistic screened Korringa-Kohn-Rostoker method for fcc Ni(100) predicts a demagnetization process of about 100 fs after the impact of the probe pulse, which is in reasonably good agreement with available experimental data.

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