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Measuring Pulse Duration and Time-Dependent Polarisation State of Ultrashort Laser Pulses with the D-Scan Technique

Ultrashort laser pulses with time-dependent polarisation states have applications such as the generation of isolated attosecond pulses and the study of the optical chirality of molecules. In this project, we develop a method to measure the time-dependent polarisation of 6 fs laser pulses with the dispersion scan technique (d-scan). First, the pulses are transmitted through a combination of two quarter-wave plates of different order to generate a time-dependent polarisation state, known as polarisation gate. We demonstrate, via simulations and measurements, that is sufficient to measure three different projections of the electric field with d-scan in order to achieve its complete reconstruction.

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