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Title:A versatile and reconfigurable setup for all-terahertz time-resolved pump-probe spectroscopy

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Abstract:A versatile optical setup for all-terahertz (THz) time resolved pump-probe spectroscopy was designed and tested. By utilizing a dual THz pulse generator emitter module, independent and synchronized THz radiation pump and probe pulses were produced, thus eliminating the need for THz beam splitters and the limitations associated with their implementation. The current THz setup allows for precise control of the electric fields splitting ratio between the THz radiation pump and probe pulses, as well as in-phase, out-of-phase, and polarization dependent pump-probe spectroscopy. Since the present THz pump-probe setup does not require specialized THz radiation optical components, such as phase shifters, polarization rotators, or wide bandwidth beam splitters, it can be easily implemented with minimal alterations to a conventional THz time domain spectroscopy system. The present setup is valuable for studying the time dynamics of THz coherent phenomena in solid-state, chemical, and biological systems.

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Uncontrolled terms:THz pulse generator emitter module - THz radiation pump - THz beam splitter - electric field splitting control - probe pulse - polarization - THz pump-probe spectroscopy - THz radiation optical component - THz time domain spectroscopy - all-terahertz time resolved spectroscopy

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