

Abstract Submitted
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THz-circuits driven by photo-thermoelectric, gate-tunable graphene-junctions¹ ALEXANDER HOLLEITNER, Technical University of Munich, Germany — We show that dual-gated graphene junctions can be functional parts of THz-circuits. As the underlying optoelectronic process, we exploit ultrafast photo-thermoelectric currents. We describe an immediate photo-thermoelectric current of the unbiased device following a femtosecond laser excitation. For a picosecond time-scale after the optical excitation, an additional photo-thermoelectric contribution shows up, which exhibits the fingerprint of a spatially inverted temperature profile. The latter can be understood by the different time-constants and thermal coupling mechanisms of the electron and phonon baths within graphene to the substrate and the metal contacts. The interplay of the processes gives rise to ultrafast electromagnetic transients in high-frequency circuits, and it is equally important for a fundamental understanding of graphene-based ultrafast photodetectors and switches.

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