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Ultrafast carrier dynamics in bilayer graphene studied by broadband infrared pump-probe spectroscopy THOMAS LIMMER, ENRICO DA COMO, ALEXANDER NIGGEBAUM, JOCHEN FELDMANN, Photonics & Optoelectronics Group, Ludwigs-Maximilans-University Munich — Recently, bilayer graphene gained a large interest because of its electrically tunable gap appearing in the middle infrared part of the electromagnetic spectrum. This feature is expected to open a number of applications of bilayer graphene in optoelectronics. In this communication we report on the first pump-probe experiment on a single bilayer flake with an unprecedented probe photon energy interval (0.25 – 1.3 eV). Single flakes were prepared by mechanical exfoliation of graphite and transferred to calcium fluoride substrates. When illuminated with 800 nm (1.5 eV) pump pulses the induced change in transmission shows an ultrafast saturation of the interband transitions from 1.3 to 0.5 eV. In this energy range the saturation recovery occurs within 3 ps and is consistent with an ultrafast relaxation of hot carriers. Interestingly, we report on the observation of a resonance at 0.4 eV characterized by a longer dynamics. The results are discussed considering many-body interactions.

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