Femtosecond pulse shaping in the mid infrared region using a Dazzler

TAKAMASA MOMOSE, The University of British Columbia, Tokyo Institute of Technology, CREST, JST, MASAAKI TSUBOUCHI, The University of British Columbia, CREST, JST, YUKI MIYAMOTO, Kyoto University — We present a method to produce programmable phase- and amplitude-modulated femtosecond laser pulses in the mid infrared region (MIR: 3 – 10 µm) by difference-frequency generation (DFG). The signal output (NIR: 1.1 – 1.5 µm) of an optical parametric amplifier was shaped with an acousto-optic programmable dispersive filter (Dazzler), and mixed in a AgGaS$_2$ crystal with the idler pulse temporary stretched by passing a dispersion block to generate MIR pulses. A Dazzler provides convenient and precise way of shaping femtosecond pulses in NIR region. It is, however, not well understood how the phase and amplitude modulations are transferred from a NIR pulse to a MIR pulse via DFG process. We will discuss the analysis of the shaped NIR and MIR pulses using a frequency-resolved optical gating (FROG) and an FT-IR.