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Rovibrational wave packet manipulation using shaped mid infrared femtosecond pulses toward quantum computing MASAAKI TSUBOUCHI, TAKAMASA MOMOSE, The University of British Columbia — Laser pulse shaping which was developed in near infrared (NIR) has been recently extended into mid infrared (MIR: 3 – 10 μm). In the presented study, the signal output (NIR: 1.1 – 1.5 μm) of an optical parametric amplifier was shaped with a Dazzler, and mixed in a $AgGaS_2$ crystal with the idler pulse to generate MIR pulses. Although the relation between the shapes of NIR and MIR light is complicated due to DFG process in the crystal with finite (2 mm) thickness, the shape of MIR light can be completely characterized by comparing with calculated profiles. The shaped MIR light which is well characterized can be used to manipulate rovibrational wave packet on the electronic ground state. We simulated the wave packet motion and its observable by solving the time-dependent Schrödinger equation, and discussed how the shape of MIR pulse is transferred into the wave packet. Application of rovibrational wave packet manipulation to quantum computation will be discussed.

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