DEVELOPMENT OF A SYSTEM FOR HIGH RESOLUTION SPECTROSCOPY WITH AN OPTICAL FREQUENCY COMB

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For high resolution spectroscopy of polyatomic molecules, a precise scale for optical frequency plays an important role. Minute spectral line shifts, line broadenings, and line splittings in rovibronic spectra, which are observed only by precise measurements with highly sophisticated spectroscopic methods, represent the interactions in the electronic excited states of polyatomic molecules.
In the present study, we use a 1 octave optical frequency comb as the scale for Doppler-free two-photon absorption spectroscopy to measure precise rovibronic transition frequencies. The optical frequency comb was generated by a Kerr lens mode locked Ti:Sapphire laser whose pulse width was 20 fs. The spectrum of the laser output was broadened to reach 1 octave by passing through a photonic crystal fiber.
In this talk, we will describe our project and the present progress.