

# Infrared and terahertz spectra measurement station under extreme conditions



Photos of the experimental station

**Magneto-infrared spectroscopy measurement unit** mainly includes: (1) the Fourier transform infrared spectrometer coupled with the 12 T split pair superconducting magnet: the energy range of the optical spectra is from 30 to 25000  $\text{cm}^{-1}$ , the energy resolution can be 0.15  $\text{cm}^{-1}$ , the temperature range of the measured samples is from 4.2 to 300 K, the highest magnetic field is 12 T; (2) the Fourier transform infrared spectrometer coupled with the 20 T solenoid superconducting magnet: the energy range of the optical spectra is from 30 to 25000  $\text{cm}^{-1}$ , the energy resolution can be 0.15  $\text{cm}^{-1}$ , the lowest sample temperature is 4.2 K, the highest magnetic field is 20 T.

**Time resolved terahertz spectroscopy measurement unit** is composed of the terahertz time-domain spectroscopy under magnetic field and multiple pump-probe measurement systems. (1) Terahertz time-domain spectroscopy under magnetic field: The available THz spectra in this configuration covers from 0.1 to 3.5 THz. The lowest

sample temperature is 1.5 K and the maximal magnetic field is 10 T. The magnetic field dependent measurements can be performed in Faraday and Voigt geometry. (2) ultrafast pump-probe spectroscopy: the intense pump beam whose energy could be tuned from near infrared down to mid-infrared (6 – 15  $\mu\text{m}$ ) and terahertz frequency ( $> 1 \text{ MV/cm}$ ) range by different optical techniques. We can perform different pump-probe measurements using the wavelength tunable lasers in the lab.

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