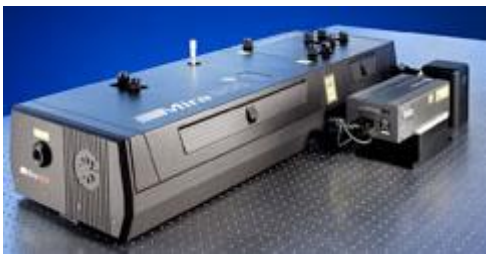
Description des équipements

1) Amplified µJ setup

- Regen type amplifier (REGA 9000, *Coherent*), Oscillator (MIRA, *Coherent*) and pumping laser (VERDI G18, *Coherent*)

- Specifications:
  - Pulse width: 160 fs
  - Wavelength: 680 to 900 nm (800nm RegA)
  - Frequencies: 260kHz (REGA) ou 80 MHz (MIRA)
  - Mean power: 1 W (REGA), 650mW (MIRA)
  - Energy per pulse: 5 µJ (REGA) or 8 nJ (MIRA)



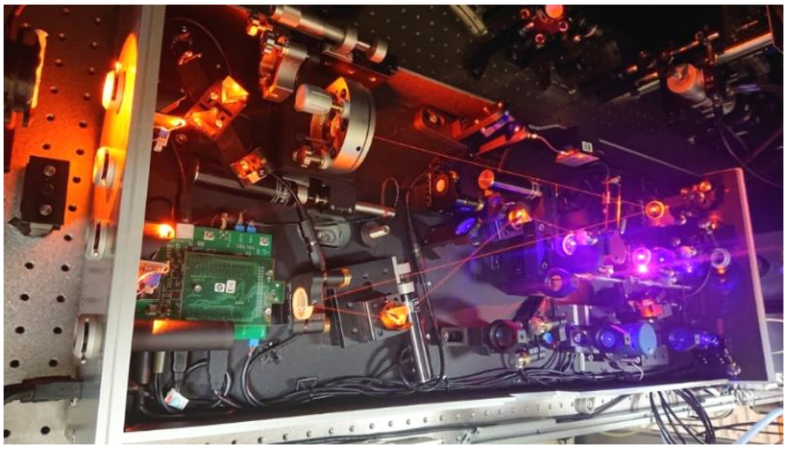
- Electronics for detection:
  - Autobalanced photodiode (*New Focus*), bandwidth 1MHz
  - Lock-in amplifier (*SRS830*) associated with acousto-optics modulator
  - Oscilloscope (*Lecroy or Keysight*) 400MHz or 200MHz

- Possibility to do electro-optic sampling (ZnTe) for THz spectroscopy

- Setup controlled by computer with Python and Labview programs.

2) « Coloured » setup

- Tunability from 345 to 2000nm



- Pump probe configuration:
  - « red » pump and probe (from 690 to 1040 nm) or « blue » (with frequency doubling: from (345 à 520 nm)
  - « visible » probe (from 491 to 750 nm) or blue (from 345 to 520 nm)
  - Idler (930-2000nm)

- Oscillator (MaiTai HP, *Spectra Physics*) :
  - Classical fs oscillator with Ti:Sa amplifier medium
  - Pulse width: 100 fs
  - Frequency: 80 MHz
  - Mean power: 2.9W max (depends on the wavelength)

- Optical parametric oscillator (OPO: Inspire, *Radiantis*):
  - Pulse width: 200 fs
  - Frequency: 80 MHz
  - Mean power (depends on the wavelength): 50 to 350 mW with OPO signal
    30 to 150mW with Idler

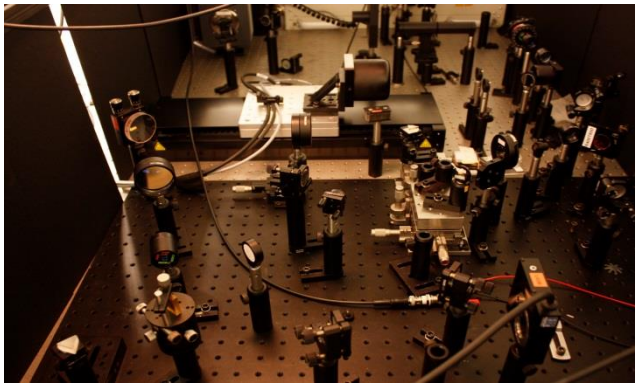
- Motion control :
  - 4 axes controlleur (XPS-RL, *Newport*)
  - Translation stage (M-IMS600PP)

- Electronics for detection:
  - Autobalanced photodiode (*Nirvana or New Focus*), bandwidth (125kHz or 1MHz)
  - Lock-in amplifier (*SR7280*) associated with electro-optics modulator (Conoptics), bandwidth 2MHz
  - Oscilloscope (*Lecroy*) 400MHz

- Setup controlled by computer with Python and Labview programs.

3) Amplified mJ setup

- Possible configuration :
  - THz generation in specific material under study
  - Pump-probe experiment with visible and THz radiations (THz generation by optical rectification in LiNbO3)



- Amplified laser (Solstice, *Spectra Physics*):
  - Pulse width: 130 fs
  - Wavelength: 805 nm
  - Frequency: 1kHz
  - Mean power: 3 W
  - Energy per pulse: 3 mJ

- Output options:
  - Uncompressed pulse train (300ps/1kHz/805nm)
  - Short TiSa oscillator (MaiTai SP, 35-100fs/80MHz/805nm)
  - Pumping laser (100ns/1kHz/532nm)

- Electronics for detection:
  - Autobalanced photodiode (*New Focus*), bandwidth 1MHz
  - Lock-in amplifier (*SRS830*) associated with a mechanical chopper
  - Oscilloscopes

- Setup controlled by computer with Python and Labview programs

4) Magneto plasmotic setup

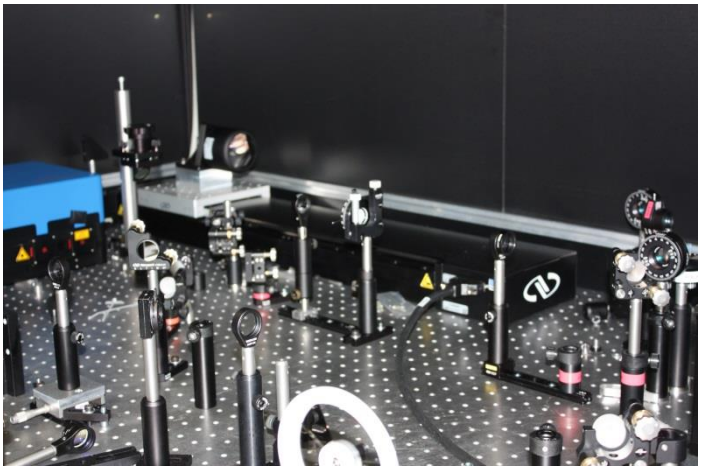
- Fiber based oscillator (FemtoFiber Pro, *Toptica*):
  - Pulse width: 120 fs
  - wavelength: 780 et 1560 nm
  - Frequency: 40MHz
  - Mean power: 140mW à 780nm,
    350mW à 1560nm

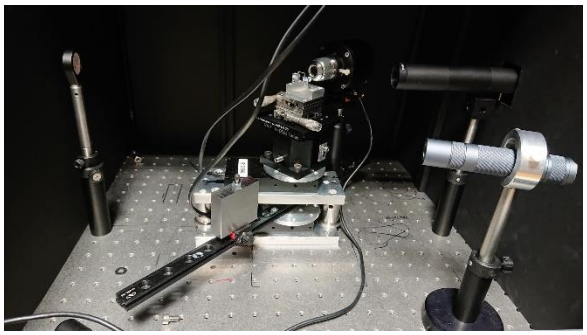
- Translation motion:
  - Motion controler (ESP301, *Newport*)
  - Rotation and translation stages

- Electronics for detection:
  - Photodiode autobalancée (*New Focus*), bandwidth 1MHz
  - PMT (Hamamatsu), photon counter (SR400)
  - Lock-in amplifier (*SRS830*) associated with a mechanical chopper

- Setup controlled by computer with labview software

- Option : Kretchman configuration



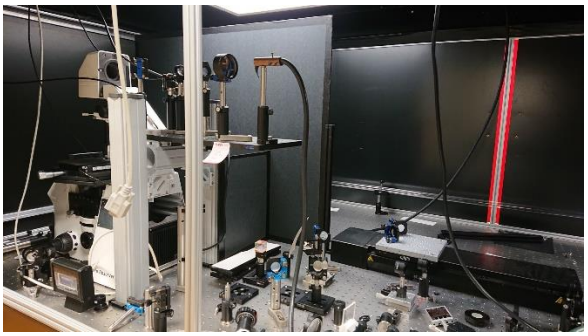


5) Pump-probe setup

- Oscillator (MaiTai HP, *Spectra Physics*) :
    - fs oscillator with Ti:Sa amplifier medium
    - Pulse width : 90 fs
    - Wavelength : 680-1040nm
    - Frequency : 80 MHz
    - Mean power : 2.7W max (depends on the wavelength)

- Options :
    - Plasmon resonance studies using a supercontinuum fiber-based laser (SuperK Extrem, *NKT Photonics*) :
        - Pulse width: ps
        - Wavelength : 390-2040nm
        - Frequency : 80 MHz
        - Mean power : 600W for visible range
    - Coupling with adapted microscope

- Setup controlled by computer with Python and Labview programs



UNION EUROPÉENNE
Région PAYS de la LOIRE
CE PROJET EST COFINANCÉ PAR
LE FONDS EUROPÉEN DE DÉVELOPPEMENT RÉGIONAL