

## Technical specifications:

- 1) The detector should contain a 1,024 element CCD (or CMOS) array with ~450nm to ~1000nm spectral range.
- 2) The maximum spectral resolution should be 1nm (or better) with optimum slit adjustment.
- 3) The detector should be able to record spectrum at 1,000/sec rate (or better).
- 4) The detector should record differential absorption ( $\Delta OD$ ) spectrum (i.e., pump-off spectrum subtracted from pump-on spectrum) using a rotating-disk optical chopper (with 1:1 mark-to-space ratio) running at 1 kHz. It is highly preferred that recording of the differential spectrum at 1kHz triggered by an external 1kHz (TTL) source for a fixed pump-probe delay and repeats the same for each subsequent pump-probe delay as the pump-probe delay is scanned.
- 5) The continuum/white-light probe should be generated inside the spectrometer.
- 6) The crystals for continuum/white-light probe generation must be interchangeable to cover a wide spectral range (~400nm to ~1050nm); edge-pass/band-pass wavelength cut-off filters must be provided by the vendor to choose optimum continuum/white-light probe bandwidth.
- 7) The continuum/white-light probe generation is preferred to be met by all reflective optics to produce ~100fs pulse-width.
- 8) All optical/opto-mechanical components must be supplied for:
  - i) Routing pump beam. Note that the pump is either output from a Ti:saph amplifier (~800nm) or output from a visible NOPA (500-750nm); dichroic beam-splitters/-combiners or flip-mirrors must be supplied if necessary.
  - ii) Routing probe beam. Note that the pump is either output from a Ti:saph amplifier (~800nm) to further generate white-light probe or output from a visible NOPA (500-750nm); dichroic beam-splitters/-combiners or flip-mirrors must be supplied *if necessary*.
- 9) The spectrometer should have an additional input beam port (on the wall, next to the two input ports) for 3-beam experiments.
- 10) The time-window for scanning should be:
  - i) Minimum: 3fs (or lower)
  - ii) Maximum: 3ns (or higher)
- 11) The spectrometer should operate both in transmission and reflection modes.
- 12) For solid samples, a sample holder with XY translation stage must be provided.
- 13) For liquid samples, a flow cell with peristaltic pump assembly with all necessary accessories (a vibration isolation platform, a pair of 2mm thick quartz cuvette, tubing, flask, clamps, etc) must be provided. Additional pairs of 1mm, 0.5mm and 0.2mm thick quartz cuvettes are preferred.
- 14) Driver & software to run each hardware component should be provided and laptop/PC with monitor has to be included. The instrument has to be completely programmable and drivers & (LabView) source code must be accessed and modified as per experimental requirement.
- 15) The data analysis software is preferred to include features, for example, storing/transferring/plotting merged/single spectra, SVD and global analysis, basic mathematical operations (e.g., addition/subtraction of multiple spectra, multiplication/division of a spectrum by a scalar number, Fourier transform, etc), post data-recording time zero adjustment, temporal chirp correction, etc.
- 16) A compact foot-print is preferred.
- 17) Detailed list of users with contact details (not more than 10 users) of this product must be provided.