DAWN HELEOS & miniDAWN TREOS Instrument Setup   
and Troubleshooting

# Objectives:

This course will familiarize the student with:

a) the locations and functions of the hardware components

b) troubleshooting of hardware

# References:

Instrument User Guide

***Flow Cell Geometry: Scattering angles and illuminated volumes***

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| ***HELEOS Read Head and Laser Assembly*** | | | |
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| ***TREOS Read Head and Laser Assembly*** | | | |
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## Hardware Workshop Topics:

1. Description of the rear panel, connections and fuses, turning instrument on.
   1. Fuses and power cable (standard); 30 min instrument warmup
   2. Nitrogen purge (HELEOS only): 30-80 psi, only when needed, e.g. operation at sub-dewpoint temp
   3. Ethernet (standard)
   4. Fan & air filter (clean yearly)
   5. Serial Tag (helpful for support calls)
   6. RJ connectors (see instrument user guide for wiring color code)
      1. Autoinject In/Out
      2. AUX in
      3. Analog Out
      4. Alarm In/Out
      5. Recycle Valve In/Out
2. Establishing communications between instrument and ASTRA software
   1. Ethernet to company network
   2. Ethernet to hub (Static *vs.* DHCP)
   3. USB→Ethernet converter (crossover)
3. Tour of interior
   1. LASER Stabilization Optics, beam splitter, Rear vs Forward L.M.; no LASER warm up if instrument is already warmed up
   2. Spatial Filter (a.k.a. pinhole)
   3. HELEOS photodiode removal & replacement (place o-ring first)
   4. Brief description of QELS fiber mount & temperature probe
   5. Differences between Ambient, H/C, HELEOS 8, TREOS read heads & circuit boards
   6. Cell removal
   7. Liquid leak sensor: description & cleaning suggestions
   8. Boards
      1. EIC
      2. Utility
      3. Flex board
      4. Organic vapor sensor and sensitivity setting
4. Flow cell removal and Flow to batch conversion kit(s)
   1. Maintain flow cell orientation with in towards the rear of the instrument
   2. Leave tubing and unions connected to cell
   3. Use of rotating batch conversion kit. (HELEOS only)
   4. microCuvette kit
5. Flow cell care
   1. Will be discussed in detail in later session
   2. Sample solubility is critical
   3. Never above pH10; acids are usually fine
   4. Be aware of glass temperature, never ramp faster than 1ºC per minute
   5. COMET
6. Heated operation and Heated lines (HELEOS)
   1. Setting temperature
   2. Use of 9mm o-rings for operation above 80° C
7. Read head detector angles vs. flow cell scattering angles (see last pages)
   1. Actual scattering angles depend upon refractive index of the solvent
   2. Software must know the refractive index of the solvent
8. Troubleshooting
   1. 0.005" i.d. tubing is "most" prone to blockage, especially for flow batch work
   2. LASER lifetime
   3. Firmware updates
   4. Virus attacks
   5. Discussion of warranty, service contract, customer support
9. Description of front panel
   1. Main
      1. Dual Graphs and scaling. Graphical representation of autoinject signal.
      2. Temperature setting (N2 gas required for temperatures less than 20.5°C)
      3. Laser/Comet/Recycle
   2. Batch
      1. Displays/scaling
      2. Use of baseline/normalize buttons
      3. Ability to disable detectors
   3. QELS (optional)
      1. ACF display
      2. Count Rate display
      3. Power sequencing and Dither
   4. Alarm
      1. Audio disable
      2. Alarm polarities
      3. Description of color code and list of alarms
      4. Alarm log
   5. System
      1. Master/Slave relation of heated line
      2. Recycle/COMET sequencing
      3. Analog out
      4. Time interval (collection rate is 36Hz, averaging lowest 25% in interval)
      5. Multi language support
      6. Restart ISI and Load Factory Default
      7. LASER power %
   6. Communication (DHCP vs. Static)