

Lambda 1050 UVVISNIR Spectrophotometer

Last Updated: 20210601

You must be a “Qualified Self-User” to operate this instrument independently.

You must be on the labs “Instrument Reservation Schedule” before touching the instrument for any reason.

Any problems, STOP, Post a note on the instrument and send an email to mtim@mit.edu immediately.

Do not perform any maintenance.

Do not install any software

Do not adjust any optics.

CORAL:

Engage the instrument using CORAL when you enter the lab.

Disengage CORAL when you are leaving the lab.

Instrument Specific Hazards

Emergencies DIAL 100

Electrical: 110-120V, 60Hz

Important:

To prevent damage, turn the bench power off before removing or installing a detector module.

Required Apparel

Safety Glasses, Gloves, Lab jacket.

Utilities:

Electricity (wall).

Emergency Shutdown:

Shutdown the computer.

Turn off the spectrometer power.

Power switch is located on the back of the instrument.

Restart after an emergency:

Restart the computer.

Turn on the spectrometer power.

Power switch is located on the back of the instrumt.

When Arriving

Checkout the instrument

Bench Power: Off

Computer: On

Software: Closed

Operation

Install the detector module you plan on using while the bench power is off.

Integrating Sphere – 250nm-2400nm, Transmission or Reflection

Three Detector Module – 175nm-3300nm, Transmission.

URA – Absolute Reflectance, Relative Reflectance, Transmission (Variable Angle).

Switch the bench power ON.

Wait three minutes

Open the software.

Run software as Analyst.

Choose the program appropriate for the detector module that is installed, OTC Sphere, Three Detector, URA or Time lapse.

Setup your measurement range and resolution. (Data Collection).

Enter # of samples and sample(s) names.

Click start.

Follow the onscreen prompts.

When finished – Save your data.

Adjusting the size of the beam

If you need to adjust the beam size:

To determine the correct beam adjust the beam size use the Manual Control Page.

In the method:

To change beam use the Common Beam Mask Control (CBM).

Choose align mode

Click on apply to change the beam size

Note: If you choose align from the method the beam will be full size, not what you set the CBM at!

Shutdown

Bench Power: Off

Software: Closed

Computer: On

Walk away with a copy of your data, No data storage here.

Clean up.

Leave the instrument in perfect condition and ready for the next user.

Disengage CORAL

Specifics

Instrument Range:

Three Detector Module: 175nm thru 3300nm (PMT, InGaAs, PBs).

Transmission.

Integrating Sphere: 250nm thru 2400nm (PMT, InGaAs).

Transmission

Reflection – Total or Diffused.

Small Spot Kit available.

Universal Reflection Accessory (URA) - Variable Angle

Polarizers:

Polarizer Drive (need to install pol crystal).

Glan Taylor Polarisers.

Sheet Polarizer.

Beam angle 3-4degrees at focal point normally.

Cuvettes

Cuvette Holder Dimensions: 12.5x12.5, 10mm pathlength.

Plastic Cuvettes from VWR: 300-1650nm

Other cuvette sources:

Starna: (800) 228-4482

https://www.starnacells.com/d_cells_s/rect/T001GL14.html

Common Materials Ranges

Optical Glass: 334-2500nm

Special Optical Glass: 320-2500nm

Pyrex: 320-2500nm

Spectrosil: 170-2700nm

Infrasil: 220-3800nm

Instrument Filter Table

WL	Pos	Type
3350	10	T-LPG-2.5
2680.8	9	T-LPG-1.5
1670.4	8	T-LPG-1.0
1190.4	7	RG780

810.4	6	RG665
690.4	5	UG550
562.4	4	BG38
379.2	3	UG11
319.2	2	T=100%
150	1	Glass Filter

Data Formats

Good Lab practice - if your data is important enough to take with you then this what you should take with you at the end of your session.

“Save Spectra” - Binary-Proprietary format - *.(Coming Soon)*,

Export as ASCII - *(.csv)* Comma Separated Values

Software Commands

Align – to turn on visible light zero order.

CBM - Common Beam Mask to adjust beam size.

CBD – Common Beam Depolarizer.

Computing

Printing to the room printer. Or attached printer.

Printer connected to this instrument

Internet Access: Yes

USB: Yes, CD: Yes, DVD: Yes

Data Analysis

WinUV Data Processing and Viewer Software is installed on the data analysis computer at the front of 13-4139.

WinUV Data Processing and Viewer Software is also available for your pc.

See Tim to sign out the installation disc.

DPV Software

Name: administrator

Pass: administrator

Instrumentation Problems?

Send me an email (mtim@mit.edu) immediately if have any problems.

Only use the CORAL system to report catastrophic instrument failures.

It is okay to try to correct a problem by restarting the Software, computer or bench.

If the problem persists:

Stop using the instrument (prevents possible damage).

Computer Restarting

Name: Administrator

Password: (blank)

Integrating Sphere procedure for Measuring Total Reflectance and Diffuse only Reflectance

Collect a Background and Zero.

Total Reflectance: Place sample on reflection sample port.

Diffuse only reflectance: remove the specular port blank from the sphere.

Return the specular port plank when finished.

Reflection Standards available for signout

Silver Mirror

50.8mm square, 3.2mm thick

Thor Labs#: ME2S-PO1

Gold Mirror

50.8mm square, 3.2mm thick

Thor Labs#: ME2S-MO1

Aluminum Mirror

50.8mm square, 3.2mm thick

Thor Labs#: ME2S-GO1

Labsphere calibrated Spectralon reflectance standard

S/N: 99AA10-0513-6797 (August 2013)

Part #: AS-01160-060, SRS-99-010

Lamp Life

Deuterium: 2000hrs

Tungsten: 1700 hrs

File Edit View Tools Help

New Edit View Run Cut Paste Delete Manual Control Views

Methods

Base Methods Folder List X

Three Detector Module
Universal Reflection Accessory (URA)
Integrating Sphere Module
Timedrive - Lambda 1050
Wavelength quant - Lambda 1050
Scanning quant - Lambda 1050
Wavelength program - Lambda 1050
Polarization scan - Lambda 1050

Methods

Name	Type	Modifi...	Modified by	Status
Service Methods	Public folder	Tuesday, ...	Administra...	
Example Methods	Public folder	Tuesday, ...	Administra...	
_User Methods	Public folder	Wednesda...	Administra...	
Scan - Lambda 1050	Scan	Tuesday, ...	Administra...	Predefined
Polarization scan - Lambda 1050	Polarization scan	Tuesday, ...	Administra...	Predefined
Wavelength program - Lambda 1050	Wavelength program	Tuesday, ...	Administra...	Predefined
Scanning quant - Lambda 1050	Scanning quant	Tuesday, ...	Administra...	Predefined
Wavelength quant - Lambda 1050	Wavelength quant	Tuesday, ...	Administra...	Predefined
Timedrive - Lambda 1050	Timedrive	Tuesday, ...	Administra...	Predefined
Universal Reflection Accessory (URA)	Scan	Wednesda...	Administra...	Draft
Three Detector Module	Scan	Monday, ...	PerkinTime...	Draft
Scan - Lambda 1050+2D	Scan	Monday, ...	Administra...	Predefined
Scanning quant - Lambda 1050+2D	Scanning quant	Monday, ...	Administra...	Predefined
Wavelength quant - Lambda 1050+2D	Wavelength quant	Monday, ...	Administra...	Predefined
Timedrive - Lambda 1050+2D	Timedrive	Monday, ...	Administra...	Predefined
Polarization scan - Lambda 1050+2D	Polarization scan	Monday, ...	Administra...	Predefined
Wavelength program - Lambda 1050+2D	Wavelength program	Monday, ...	Administra...	Predefined
Scan - Lambda 10502D	Scan	Monday, ...	Administra...	Predefined
Timedrive - Lambda 10502D	Timedrive	Monday, ...	Administra...	Predefined
Polarization scan - Lambda 10502D	Polarization scan	Monday, ...	Administra...	Predefined
Wavelength program - Lambda 10502D	Wavelength program	Monday, ...	Administra...	Predefined
Scanning quant - Lambda 10502D	Scanning quant	Monday, ...	Administra...	Predefined
Wavelength quant - Lambda 10502D	Wavelength quant	Monday, ...	Administra...	Predefined
Integrating Sphere Module	Scan	Friday, De...	Analyst	Draft

Integrating Sphere Module
Description: Integrating Sphere Default Method
Type: Scan
Created by: Analyst
Created on: Friday, December 4, 2020 10:24 AM Eastern Standard Time
Modified by: Analyst
Modified on: Friday, December 4, 2020 10:24 AM Eastern Standard Time
Revision: 1
Method ID: {80126160-56FD-468E-A20C-E0F2AC5597A1}
Instrument: High performance UV/Vis/NIR instrument
Status: Draft

Three Detector Module

The screenshot displays the 'Three Detector Module' software interface. At the top, a menu bar includes File, Edit, View, Data Collection, Tools, and Help. Below the menu is a toolbar with icons for Open, Cut, Copy, Paste, Report, Send To DPV, Start, Stop, Set λ , Autozero, and Align. A status bar shows 'Idle', '2499.99 nm', '86.2069 % T', and 'Slit width 20.00 nm'.

The main interface is divided into several sections:

- Folder List:** A tree view on the left showing the hierarchy: Task > Data Collection > Program > Accessory > Corrections > Sample Info > Processing > Results > Output.
- Lamp Selection:** Three buttons for 'D2 Lamp', 'External Lamps', and 'Tungsten Lamp'. The 'D2 Lamp' and 'Tungsten Lamp' buttons are checked. A 'Lamp Change' button is also present with a value of 319.20 (nm).
- Method Settings:** A panel on the right with 'From' (3300.00 nm) and 'To' (175.00 nm) wavelength ranges. It also includes 'Data Interval' (1.00 nm), 'Ordinate Mode' (%T), and 'Scan Speed' (461.86 nm/min).
- Cycles:** A section with 'Number of cycles' set to 1 and a radio button for 'As fast as possible'.
- Detector Settings:** A panel with 'Gain' and 'Response' settings for 'PMT' (Auto, 0.12 s) and 'InGaAs' (1.00, 0.12 s).
- Beam Path Diagram:** A central schematic showing the optical path. It includes components like 'Beam Selection', 'CBD', 'Attenuators', 'Pol/Depol', 'Sample Compartment', 'Monochromator', 'Slits', and 'Detector Change'. The path is color-coded: blue for the main path and red for a secondary path.

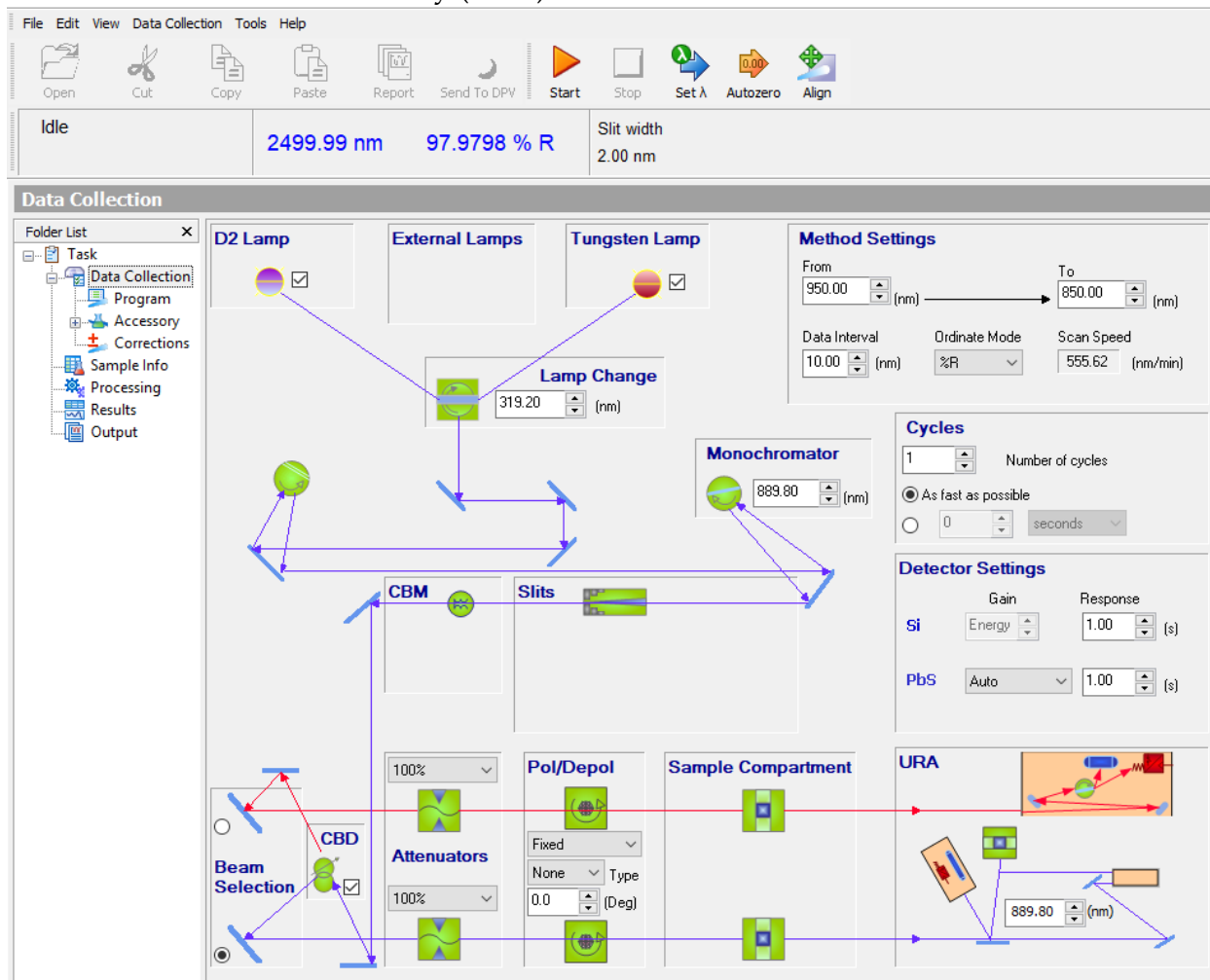
Integrating Sphere

The screenshot displays the Integrating Sphere software interface. At the top, a menu bar includes File, Edit, View, Data Collection, Tools, and Help. Below the menu is a toolbar with icons for Open, Cut, Copy, Paste, Report, Send To DPV, Start, Stop, Set λ , Autozero, and Align. The status bar shows 'Idle', '2499.99 nm', '-26.1535 % T', and 'Slit width 20.00 nm'.

The main interface is divided into several sections:

- Folder List:** A tree view on the left showing folders for Task, Data Collection, Program, Accessory, Corrections, Sample Info, Processing, Results, and Output.
- Lamp Selection:** Three panels for 'D2 Lamp', 'External Lamps', and 'Tungsten Lamp'. The 'D2 Lamp' and 'Tungsten Lamp' are selected with checkboxes. A 'Lamp Change' panel shows a value of 319.20 (nm).
- Method Settings:** A panel on the right with 'From' (2500.00 nm) and 'To' (250.00 nm) wavelength ranges, 'Data Interval' (10.00 nm), 'Ordinate Mode' (%T), and 'Scan Speed' (2028.03 nm/min).
- Cycles:** A panel with 'Number of cycles' (1) and a radio button for 'As fast as possible'.
- Detector Settings:** A panel with 'Gain' and 'Response' for 'PMT' (Auto, 0.20 s) and 'InGaAs' (1.00, 0.20 s).
- Beam Path Diagram:** A central diagram showing the optical path. It includes a 'Beam Selection' panel, 'CBD' (Circular Beam Detector) and 'CBM' (Circular Beam Monitor) panels, 'Attenuators' (set to 100%), 'Pol/Depol' (Fixed, 0.0), 'Sample Compartment', and a 'Detector Change' panel showing 'PMT' and 'InGaAs' detectors.

Universal Reflectance Accessory (URA)



Changing Beam Size - Choose Instrument

Name	MIT Lambda 1050
Type	Lambda 1050
Serial number	1050N1503181
Port	COM4
Installed on	Wednesday, December 2, 2020 10:50 AM Eastern Standard Time

Enter Alignment Mode – Choose CBM Size

