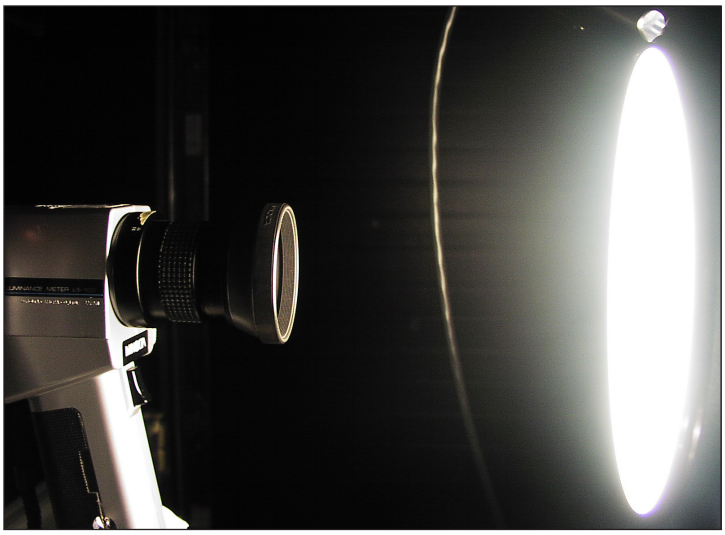
Unparalleled Characterization and Calibration



The concept of HELIOS Uniform Luminance & Radiance Systems is to provide a whole new level of knowledge about the radiometric performance of each system. Our calibration laboratories have been designed to ensure fast, repeatable, COMPLETE testing of each system with industry-leading uncertainty.

HELIOS calibrations first start by matching CCTs on the lamps as closely as possible. Then multiple spectral radiance measurements are done for each lamp and for several levels of operation over the dynamic range of the system. Data from the detector, or multiple detectors or spectrometers are gather during each measurement. Each HELIOS system is then measured again for spatial and angular uniformity on each lamp, multiple lamps and over several levels of operation. This extensive and unique level of product characterization gives Labsphere the ability to establish a full operational checkout and ensure performance across multiple systems, multiple system batches and establish understood and repeatable product norms.

In addition to our innovative testing systems, we also offer optional additional services on our core double-monochromator based system for world-class uncertainty. This system also provides us with a foundation for HELIOS testing system speed and accuracy.

Our goal is to provide you the testing data, product consistency and highest level of performance and uncertainty on every HELIOS product that current technology allows. HELIOS system characterization is provided whether you buy one system or a product suite for your whole enterprise from R&D to Production to Field Use.

VALUE

Fast, automatic and semi-automatic test stations for each HELIOS system

Characterization and calibration in almost every relevant state of use for each system at no additional charge

Uniformity verification over all lamps and levels

Database of archived calibration tied to system serial numbers for each tracking and re-calibration

Unique characterizations to each HELIOS Family of systems that suit relevant application and industry needs

A true-dark lab for low-level testing and certification

All data provided in Excel format and PDF (Certificates) on USB stick for use with HELIOSense software

World-Class calibration standards laboratory with over 35 years of Labsphere experience

Existing System Re-Calibrations

When it comes time to renew your system certification and commissioning, HELIOS provides quick and efficient re-calibration services grouped by the family of the system that you purchased. This enables you to quickly calculate the cost of ownership going forward.

VALUE

Similar suite of calibrations to the original system calibrations

Each calibration includes QTH replacements as part of our service to make sure you're working at peak condition

Plasma Lamps and Xenon Lamp replacements can be ordered as options

HELIOS common calibrations allows Labsphere the ability to quickly turn the system so you can keep working

We also offer electronic calibration as an option to make sure our detectors, power supplies and other electronic items are all in compliance

Out-Of-Tolerance Reports (OOTR) can also be ordered for either optical or electronic calibrations. OOTR compares your system in an "as-received" state to your original calibration, so you have a record of any offsets that may have happened during your use. We report on the OOTR before we place any new calibrations on the system

Ocean Photonics

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System Calibrations by Configuration

NEW CATALOG NAMES	NEW SMART PARTS	Set CCT	Set Pinhole	Spectral Radiance	Luminance SD-S1 Current Record Filter (3) & Pinoles (3)	Luminance SD-L1	VA Pos vs. Spectrum - QTH	VA Manual vs. Spectrum QTH	VA Pos. vs. Spectrum - Xenon	VA Manual vs. Spectrum Xenon	VA Pos. vs. Spectrum - Plasma	VA Manual vs. Spectrum Plasma	Uniformity Spatial	Uniformity Angular	Uniformity Spatial with VA Level	Uniformity Spatial w/ manual VA Level	Low Level Luminance	Low Level Spec. Rad	Low Level Uniformity	Spectrometer File	InGaAs Response	Ex-InGaAs Response	UV Xenon Spectral
USLR-D20F-NANS	D5NA-NSNN-N1SR-NS00-0000	4	1	5	5	1	1						5	5	1								
USLR-D20F-NDNN	D5ND-NNNN-NNSR-NS00-0000	4	1	5	5		1						5	5	1								
USLR-D20F-NMNN	D5NM-NNNN-N1SR-NS00-0000	4	1	5	5			1					5	5		1							
USLR-D12F-NANS	D3NA-NSNN-N1SR-NS00-0000	3	1	4	4	1	1						4	4	1								
USRL-D12L-NANS	D4NA-NSPN-N1SR-NS00-0000	3	1	4	4		1						4	4	1								
USLR-D12F-NDNN	D3ND-NNNN-NNSR-NS00-0000	3	1	4	4		1						4	4	1								
USLR-D12L-NDNN	D4ND-NNNN-NNSR-NS00-0000	3	1	4	4		1						4	4	1								
USLR-D12F-NMNN	D3NM-NNNN-NNSR-NS00-0000	3	1	4	4			1					4	4		1							
USLR-D12L-NMNN	D4NM-NNNN-NNSR-NS00-0000	3	1	4	4			1					4	4		1							
USLR-D08F-NANS	D1NA-NSNN-N1SR-NS00-0000	2	1	3	3		1						3	3	1								
USLR-D08L-NANS	D2NA-NSNN-N1SR-NS00-0000	2	1	3	3		1						3	3	1								
USLR-D08F-NDNN	D1ND-NNNN-NNSR-NS00-0000	2	1	3	3		1						3	3	1								
USLR-D08L-NDNN	D2ND-NNNN-NNSR-NS00-0000	2	1	3	3		1						3	3	1								
USLR-D08F-NMNN	D1NM-NNNN-NNSR-NS00-0000	2	1	3	3			1					3	3		1							
USLR-D08L-NMNN	D2NM-NNNN-NNSR-NS00-0000	2	1	3	3			1					3	3		1							
USLR-L20F-NBNL	L5NB-NLNN-NNLR-NS00-0000	5	1		5	5	1										1	1	1				
USLR-L12F-NBNL	L3NB-NLNN-NNLR-NS00-0000	5	1		5	5	1										1	1	1				
USLR-L12L-NBNL	L4NB-NLNN-NNLR-NS00-0000	5	1		5	5	1										1	1	1				
USLR-L08F-NBNL	L1NB-NLNN-NNLR-NS00-0000	4	1		4	4	1										1	1	1				
USLR-L08L-NBNL	L2NB-NLNN-NNLR-NS00-0000	4	1		4	4	1										1	1	1				
USLR-A20F-XAN2	A5XA-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A20F-XDN2	A5XD-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A20F-XMN2	A5XM-N2NN-NNAR-NS00-0000	3	1	3	3			1		1			3	3	3					1			
USLR-A20F-PAN2	A5PA-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A20F-PDN2	A5PD-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A20F-PMN2	A5PM-N2NN-NNAR-NS00-0000	3	1	3	3			1		1		1	3	3	3					1			
USLR-A12F-XAN2	A3XA-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A12L-XAN2	A4XA-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A12L-UAN1	A4UA-N1NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			1
USLR-A12F-XDN2	A3XD-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A12L-XDN2	A4XD-N2NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			
USLR-A12L-UDN1	A4UD-N1NN-NNAR-NS00-0000	3	1	3	3		1		1				3	3	3					1			1
USLR-A12F-XMN2	A3XM-N2NN-NNAR-NS00-0000	3	1	3	3			1		1			3	3	3					1			
USLR-A12L-XMN2	A4XM-N2NN-NNAR-NS00-0000	3	1	3	3			1		1			3	3	3					1			
USLR-A12L-UMN1	A4UM-N1NN-NNAR-NS00-0000	3	1	3	3			1		1			3	3	3					1			1
USLR-A12F-PAN2	A3PA-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A12L-PAN2	A4PA-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A12F-PDN2	A3PD-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A12L-PDN2	A4PD-N2NN-NNAR-NS00-0000	3	1	3	3		1				1		3	3	3					1			
USLR-A12F-PMN2	A3PM-N2NN-NNAR-NS00-0000	3	1	3	3			1				1	3	3	3					1			
USLR-A12L-PMN2	A4PM-N2NN-NNAR-NS00-0000	3	1	3	3			1				1	3	3	3					1			
USLR-V20F-NMNN	V5NM-NNNN-NNSL-NS00-0000	1	1	1	1			1					1	1	1								
USLR-V12F-NMNN	V3NM-NNNN-NNSL-NS00-0000	1	1	1	1			1					1	1	1								
USLR-V08F-NMNN	V1NM-NNNN-NNSL-NS00-0000	1	1	1	1			1					1	1	1								
USLR-S20F-NNSN	S5NN-SNNN-NNSL-NS00-0000	4	1	5	5								5	5									
USLR-S12F-NNSN	S3NN-SNNN-NNSL-NS00-0000	4	1	5	5								5	5									
USLR-S08F-NNSN	S1NN-SNNN-NNSL-NS00-0000	3	1	4	4								4	4									
USLR-S08F-NN3N	S1NN-3NNN-NNSL-NS00-0000	1	1	1	1								1	1									
USLR-S08F-NN7N	S1NN-7NNN-NNSL-NS00-0000	1	1	1	1								1	1									

Spectral Radiance Calibration Service

On-site Service for Recalibration and Servicing of Uniform Source Systems

SERVICE RECOMMENDED IF

- System lamps have been operated for more than 50 hours
- System is more than two years old
- System has operated or been stored in dusty environment
- Quality Management System mandates annual calibrations on critical measurement equipment
- Monitor detector disagrees with the original calibration certificate

SERVICE FEATURES

- Professional assessment of the overall condition of system
- Relamping the sphere with before and after measurements
- Power supply calibration option
- NIST traceable measurements with reported uncertainty
- Calibration is certified on-site
- Minimal downtime with flexible scheduling

The spectral radiance measurement service of an integrating sphere source of uniform radiance ("uniform source") is performed by direct comparison of measurements carried out with equipment and methods traceable to the NIST. Measurement uncertainty is determined by best practices of expressions of uncertainties.

The measurements are accomplished by referencing a calibrated Spectralon® target of known diffuse reflectance factor that is irradiated by an FEL type tungsten halogen spectral irradiance lamp standard. The Spectralon® target becomes the reference source of spectral radiance expressed as:

$$L_\lambda = \frac{E_\lambda \rho_\lambda}{\pi} \qquad (mW/cm^2\ sr\ nm)$$

Where L is the spectral radiance of the target, E is the spectral irradiance of the FEL at its calibrated distance and ρ is the spectral reflectance factor of the Spectralon® target.

The spectral radiance is then used to calibrate the field service spectroradiometer. The spectroradiometer spectral radiance responsivity is achieved by scanning and collecting the spectral radiance of the irradiated target and recording the responses. The spectral radiance responsivity calibration is performed on a full range UV-VIS-NIR dispersive spectroradiometer. The spectral measurements are performed with this FOV positioned at the center of the plane of the diffuse target. The radiance of the Spectralon® target is transferred to the diffraction grating array spectrometer with a fixed mounted 1.2 meter metal clad fiber optic cable coupled to a 5 degree field of view foreoptic radiance detector head via an SMA-905 connector. Long pass order sorting filters are used reduce stray light and block higher orders.

The baseline of an FEL Target Irradiance which is within 1.8-2.3% is the basis for our primary calibration at our laboratory. Reference values can be provided upon request.

The validation of our on-site calibration service is the key aspect to this service. The estimated measurement uncertainty of an on-site measurement is determined as follows:

$$L_{DUT} = \frac{S_{DUT} L_{ref}}{S_{ref}} = \frac{S_{DUT}}{S_{ref}} * \frac{\beta \rho_{45} E_{e0} \left(\frac{I_e}{I_{e0}}\right)^{M_2} (1 - \alpha \Delta t) * 50^2}{\pi * \left(\sqrt{D^2 - x^2 - z^2}\right)^2}$$

Expression of Radiance Uncertainty for Radiometric Transfer with Spectral Radiometer

S_{DUT} is the spectral response of the spectral radiometer to the customer DUT

S_{ref} is the spectral response of the spectral radiometer to the calibration reference

L_{ref} is the spectral radiance of the calibration reference

β is the angular dependence of the reflectance factor

ρ is the Spectralon® target spectral reflectance factor

E is the spectral irradiance of the FEL reference standard

I is the FEL operating current

M is FEL irradiance relationship factor

$(1 - \alpha\Delta t)$ is the FEL tungsten halogen lamp aging factor

D is the calibration distance of the FEL

x is the lateral tilting offset of the distance measurement, and

z is the offset of the between the target and the center and the reference plane of the target

On-Site Calibration Services

You've made a large capital investment in a specialized optical system – let us keep it running for you in world class condition!
We'll Come To You.

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Contact your local rep or go to www.labsphere.com/products/services/on-site-calibration-services/ to download more information.

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D-FAMILY RECALIBRATIONS

H-D-OCAL	SYSTEMS - HELIOS	D-Family Optical Calibration Service. Includes lamp replacements. Electronics calibration must be purchased separately. OTR Reports must be purchased separately.	
H-D-ECAL	SYSTEMS - HELIOS	Electronics Recalibration of HELIOS D System Power Supplies, Detectors and other system rack electronics	
H-D-OOTR	SYSTEMS - HELIOS	Optical Out of Tolerance Report for D System. Comparison of Incoming System State ot Last Calibration State	
H-D-EOTR	SYSTEMS - HELIOS	Electronics Out of Tolerance Report for D System. Comparison of Incoming System State ot Last Calibration State	

A-FAMILY RECALIBRATIONS

H-A-OCAL	SYSTEMS - HELIOS	A-Family Optical Calibration Service. Includes lamp replacements and spectrometer wavelength verification. Electronics calibration must be purchased separately. OTR Reports must be purchased separately.	
H-A-ECAL	SYSTEMS - HELIOS	Electronics Recalibration of HELIOS A System Power Supplies, Detectors and other system rack electronics	
H-A-OOTR	SYSTEMS - HELIOS	Optical Out of Tolerance Report for A System. Comparison of Incoming System State ot Last Calibration State	
H-A-EOTR	SYSTEMS - HELIOS	Electronics Out of Tolerance Report for A System. Comparison of Incoming System State ot Last Calibration State	

L-FAMILY RECALIBRATIONS

H-L-OCAL	SYSTEMS - HELIOS	L-Family Optical Calibration Service. Includes lamp replacements. Electronics calibration must be purchased separately. OTR Reports must be purchased separately.	
H-L-ECAL	SYSTEMS - HELIOS	Electronics Recalibration of HELIOS L System Power Supplies, Detectors and other system rack electronics	
H-L-OOTR	SYSTEMS - HELIOS	Optical Out of Tolerance Report for L System. Comparison of Incoming System State ot Last Calibration State	
H-L-EOTR	SYSTEMS - HELIOS	Electronics Out of Tolerance Report for L System. Comparison of Incoming System State ot Last Calibration State	

V-FAMILY RECALIBRATIONS

H-V-OCAL	SYSTEMS - HELIOS	V-Family Optical Calibration Service. Includes lamp replacements. Electronics calibration must be purchased separately. OTR Reports must be purchased separately.	
H-V-ECAL	SYSTEMS - HELIOS	Electronics Recalibration of HELIOS V System Power Supplies, Detectors and other system rack electronics	
H-V-OOTR	SYSTEMS - HELIOS	Optical Out of Tolerance Report for V System. Comparison of Incoming System State ot Last Calibration State	
H-V-EOTR	SYSTEMS - HELIOS	Electronics Out of Tolerance Report for V System. Comparison of Incoming System State ot Last Calibration State	

S-FAMILY RECALIBRATIONS

H-S-ONSITE	SYSTEMS - HELIOS	S-Family 1-Day On-Site Calibration Service (Single Sources). Includes Optical and Electrical Certified Calibrations. OTRs must be ordered separately. Travel, Shipping and Expenses will be estimated and billed separately	
H-S-OCAL	SYSTEMS - HELIOS	S-Family Optical Calibration Service. Includes lamp replacements. Electronics calibration must be purchased separately. OTR Reports must be purchased separately.	
H-S-ECAL	SYSTEMS - HELIOS	Electronics Recalibration of HELIOS S System Power Supplies, Detectors and other system rack electronics	
H-S-OOTR	SYSTEMS - HELIOS	Optical Out of Tolerance Report for S System. Comparison of Incoming System State ot Last Calibration State	
H-S-EOTR	SYSTEMS - HELIOS	Electronics Out of Tolerance Report for S System. Comparison of Incoming System State ot Last Calibration State	

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