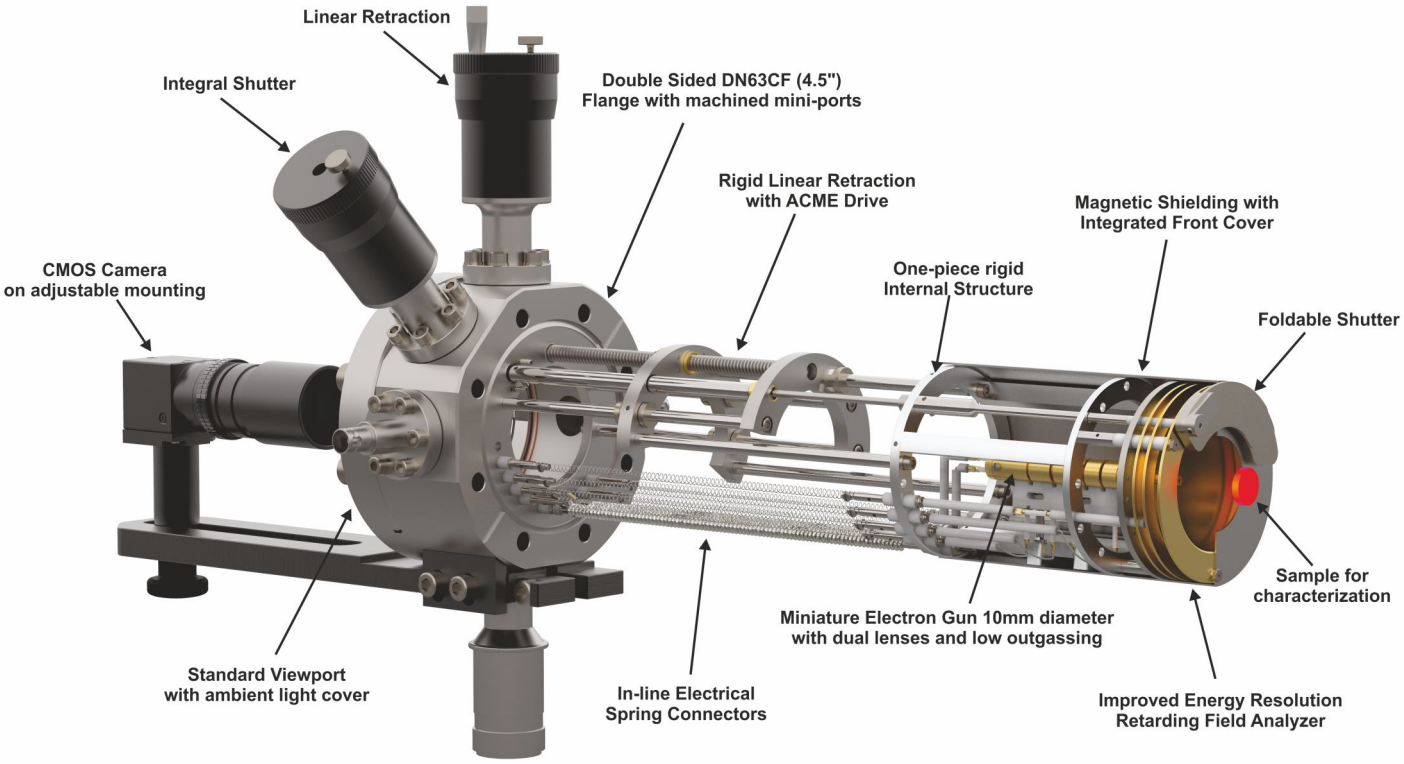
Surface Crystallography Spectrometer - IntegraLEED

based on Low Energy Electron Diffraction (LEED) and Auger Electron Spectroscopy (AES)

Model LEED 450-MAX (BDL450-MAX) with Integral Retraction and Shutter



Mounting flange: 4.5" CF (DN63CF) with oversized tubing: 76mm (3") O.D.

Features:

- Sufficient angular and energy resolution to detect surface reconstructions and composition changes
- Miniature Electron Gun with double focusing
- Superior magnetic shielding
- Moiré pattern reduction
- Suitable for ”in situ” growth monitoring
- Integral Linear Motion and Shutter
- Low Outgassing Rate
- Easy add-on AES

Applications

Miniature model with maximized display for basic surface crystallography of single crystals and “in-situ” epitaxy.

The LEED 450 MAX is capable of providing LEED and AES data for a wide range of samples.

The miniature instrument size allows for easy installation to smaller UHV systems.

Materials suitable for characterization should be single crystals and epitaxial films in categories such as: 2D materials, semiconductors, metals, oxides and magnetic films.

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IntegraLEED - Model LEED 450-MAX

Specifications

LEED-AUGER OPTICS (Model BDL450-MAX)

Retarding Field Analyzer	Concentric assembly of hemispherical grids working distance from sample 10 mm
Grid Material	Gold coated St-Steel wire mesh (100 mesh, 81% transparency)
Energy Resolution	0.2% - 0.5% at low modulation volt.
Glass-Display	Fused silica glass coated with indium-tin oxide conductive layer and P31 phosphor (ZnS:Ag:Cu-green, 525 nm wavelength) 92° angle of acceptance from sample at a distance of 38 mm
Monitoring	Standard viewport on DN63CF (4.5" CF) Flange
Linear Motion	Up to 150 mm retraction from sample (100 mm standard); linear ball bearing and acme thread with all spring electrical connections
Integral Shutter	Open and close at any position of the linear motion
Magnetic Shielding	Mu-metal cylinder with front cover for maximum magnetic field attenuation
Assembly	Extreme-high-vacuum compatibility with stainless steel, high alumina and gold-plated copper alloy materials
Mounting	**DN63CF(4.5"CF) with oversized tubing: 76mm(3") O.D.**
Bakeability	Under vacuum, 250°C maximum

INTEGRAL MINIATURE ELECTRON GUN

Beam Energy	LEED - 5 eV to 750 eV AES - 5 eV to 3000 eV
Beam Current	LEED - 2 µA at 100 eV and 0.5 mm beam size AES - up to 100 µA at 3 keV
Beam Size	from 1 mm to 250 µm - adjusted by wehnelt voltage
Electron Source	Tungsten-2%Thoriated filament standard, single crystal LaB6 filament optional
Energy Spread	0.45 eV (thoriated-tungsten filament)
Overall Size	10 mm lens diameter and 80 mm length

Ordering Guide

LEED Application:

BDL450-MAX	LEED optics with integral electron gun on 4.5" flange - 3 Grids
LMX	Linear motion (X=retraction distance)
ISH	Integral shutter
LPS075-D	Digital power supply with voltage range 0 - 750 V
LIM12	LEED imaging software with CMOS camera, full version (optional)
LIM12B	LEED imaging software with CMOS camera, basic version (optional)

LEED and AES Application:

BDL450-MAX	LEED optics with integral electron gun on 4.5" flange - 4 Grids
LMX	Linear motion (X=retraction distance)
ISH	Integral shutter
LPS300-D	Digital power supply with voltage range 0 - 3 kV
LOA10-AES	Digital AES controller with ramp voltage, sinewave oscillator, lock-in and AES software
LIM12	LEED imaging software with CMOS camera, full version (optional)
LIM12B	LEED imaging software with CMOS camera, basic version (optional)

Control Electronics

LPS075-D	Digital LEED power supply (0-750 V) with USB interface and PC control software for Windows 10/11. True primary beam current and total emission measurements. Automatic start-up, shut down, 10 memory settings including standby and outgassing mode with timer and constant beam current mode.
LPS300-D	Digital LEED-AES power supply (0-3.2 kV) with USB interface and PC control software for Windows 10/11. True primary beam current and total emission measurements. Automatic start-up and shut down, 10 memory settings including outgassing with timer, automatic switch from LEED to AES and constant beam current mode.
LOA10-AES	Digital AES controller with lock-in amplifier, AES high voltage ramp board 0-2.0 kV with precision sinewave oscillator (0.5-20 Vpk-pk) and AES software for Windows 10/11. USB communication to PC.

LEED Software

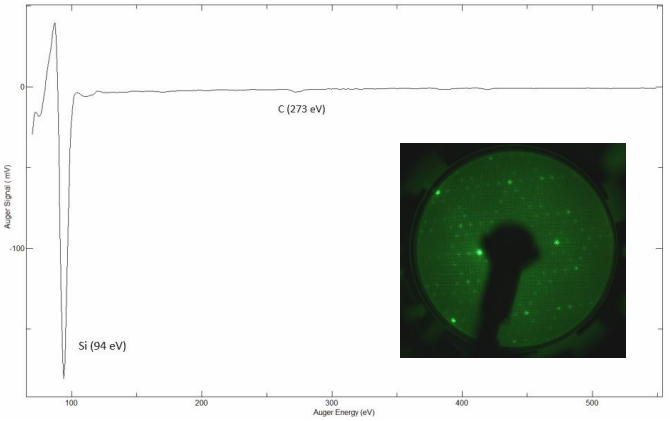
LIM12B	Basic LEED pattern measurements and analysis software and hardware for Windows 10/11 including: ·Automatic LEED pattern acquisition ·CMOS camera ·Flange Mounting kit with ambient light cover and cables
LIM12	Full version LEED pattern measurements and analysis software and hardware for Windows 10/11 including: ·CMOS camera ·Flange mounting kit with ambient light cover and cables ·Software features: • Automatic LEED pattern acquisition • Automatic I-V analysis with spot tracking • Automatic I-T analysis • Automatic spot profile analysis

CMOS Camera Specifications

·12-bit colour high performance video CMOS camera with sensitivity control and USB3.1 interface
·1/3" CCD sensor size, image size: 1.6 MP (1440x1080), 3.45 um pixel size, CS-mount lenses
·Linear Full Well: 9000e-, Dynamic Range: 47 dB

Data

LEED pattern and AES spectrum Si (111)
- single crystal wafer after thermal annealing in UHV

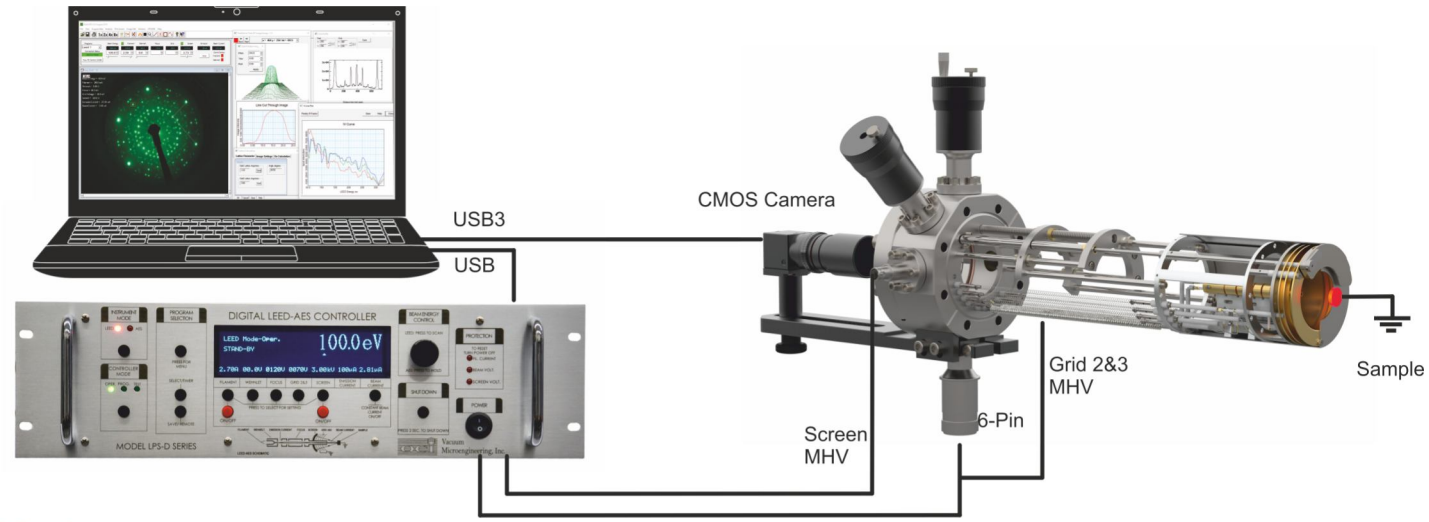


Link for more data:
http://www.ocivm.com/leed-aes-data.html

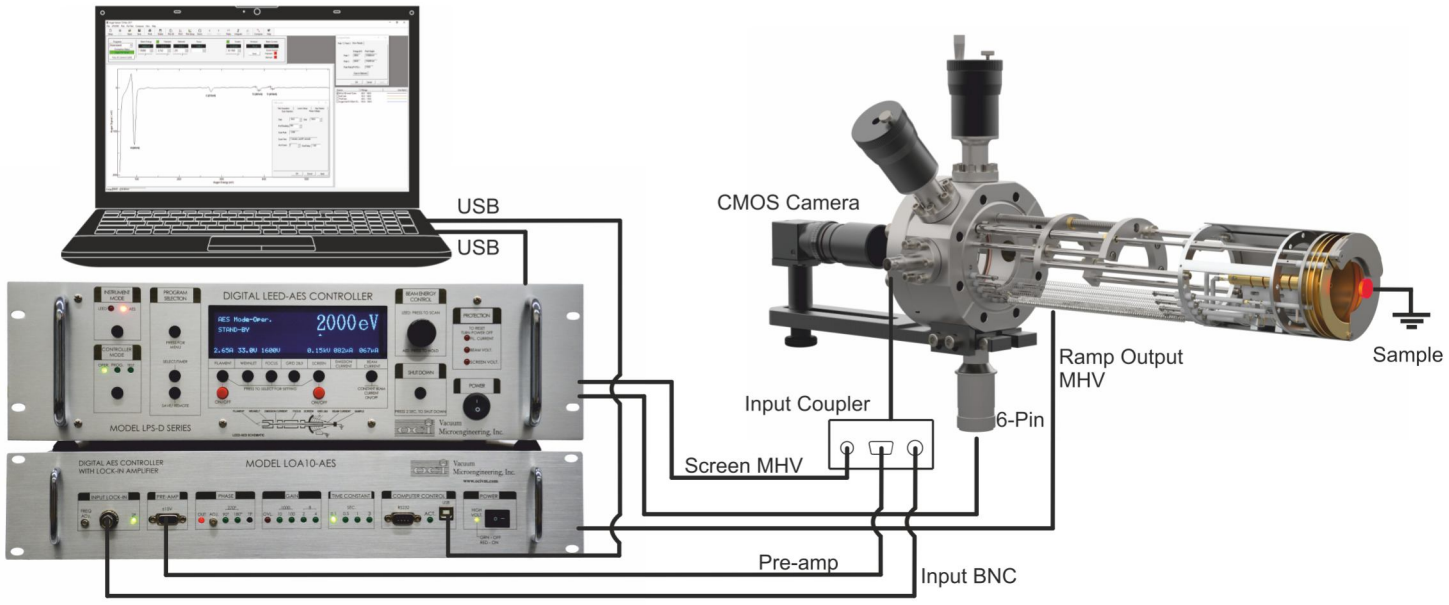
IntegraLEED - Model LEED 450-MAX

Connection Diagrams

LEED Mode

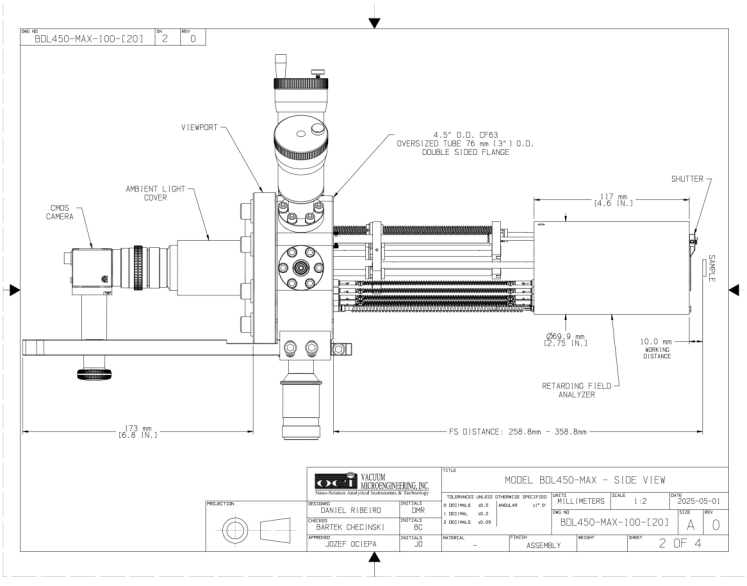


AES Mode



Schematic Drawings

BDL450-MAX
SIDE VIEW
WITH 100mm RETRACTION



IntegraLEED - MODEL LEED 450-MAX

LEED Optics and UHV Chamber Configuration

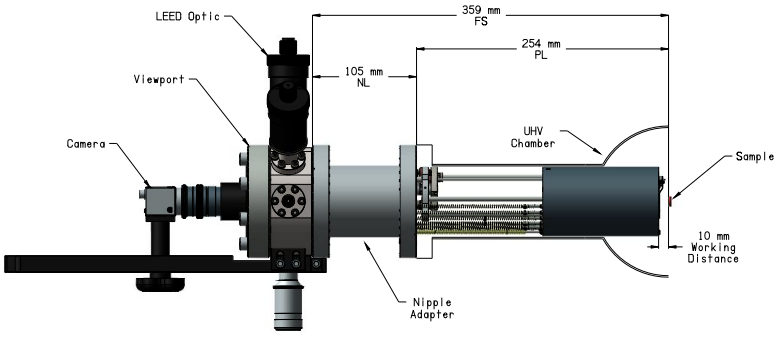
Calculation formula for Flange-Sample distance and Retraction length:

FS = 159 mm + 2 LMX - OV

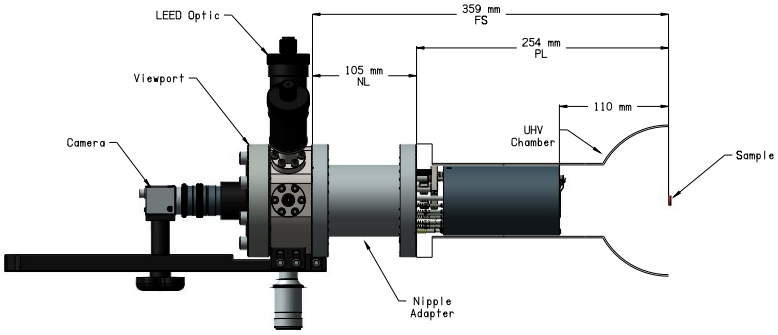
FS - flange to sample distance
LMX - retraction length
OV - overlapping length

PL - port length
NL - nipple length

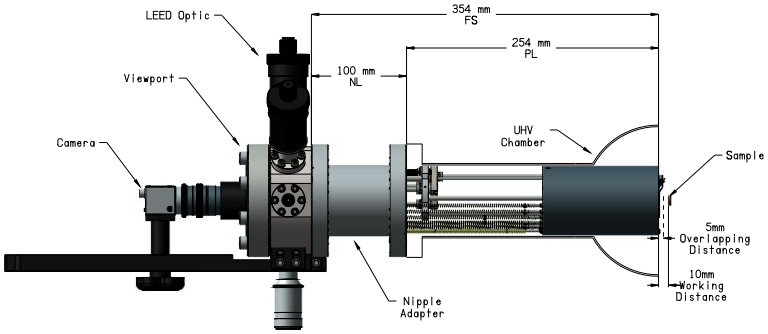
Schematic Diagrams for 100 mm Retraction



Example:
Operating (working) Position
FS: 359 mm PL: 254 mm
LMX: 100 mm NL: 105 mm
OV: 0 mm



Retracted (parking) Position
FS: 359 mm PL: 254 mm
LMX: 100 mm NL: 105 mm
OV: 0 mm



Operating (working) Position with Overlap
FS: 354 mm PL: 254 mm
LMX: 100 mm NL: 100 mm
OV: 5 mm