Scanning Slit Beam Profilers

DataRay's Beam'R2 is well suited for many laser beam profiling applications. With both standard 2.5 μm slits and larger knife-edge slits, the Beam'R2 is capable of measuring beams with diameters as small as 2 μm. With options for both silicon and InGaAs or extended InGaAs, the Beam'R2 can profile beams from 190 nm to 2500 nm. Scanning slit instruments offer much higher resolution than camera based systems.

DataRay's BeamMap2 represents a radically different approach to real-time beam profiling. It extends the Beam'R2's measurement capabilities by allowing for measurements at multiple locations along the beam's travel. This real-time slit scanning system uses XY slit pairs in multiple z planes on a rotating puck to simultaneously measure four beam profiles at four different z locations. The BeamMap2's unique, patented design is most advantageous for real-time measurement of focus position, M^2, beam divergence and pointing.

BeamMap2
2.4 x 2.3 x 2.62"

System Features

- ISO compliant beam diameter measurements
- Port-powered USB2.0
- Auto-gain function
- Optional stage accessory for ISO 11146 compliant M^2 measurements.
- True2D slits
- Resolution up to 0.1 μm
- Detector options, 190 – 2500 nm
- 5 Hz update rate (user adjustable 2-12 Hz)
- Measure high repetition pulsed lasers
 - Pulsed Minimum PRR = [500/(beam diameter in μm)] kHz
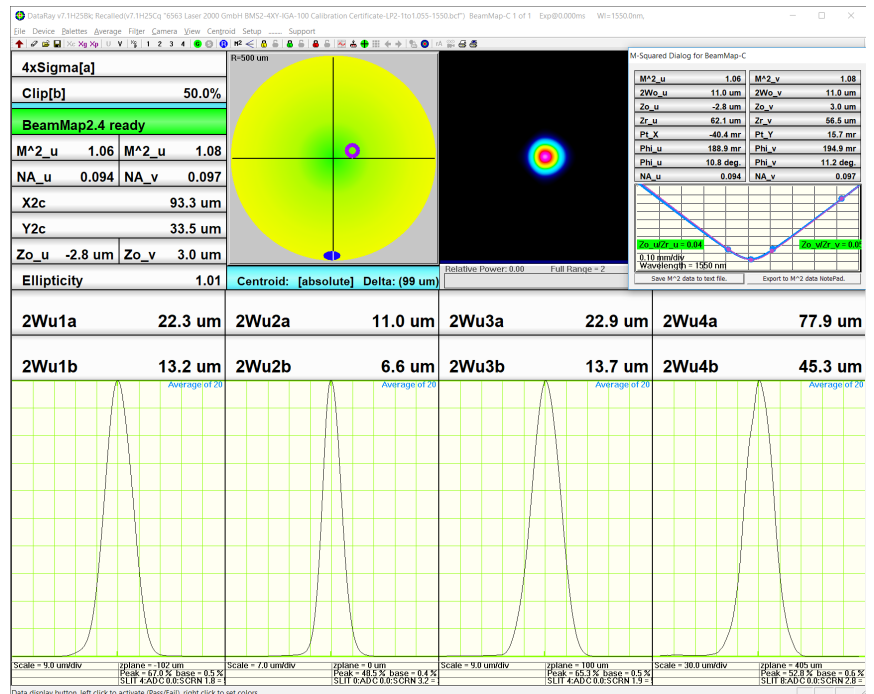
BeamMap2 adds the following features

- Multiple z-plane scanning
- XYZ profiles, plus θ-Φ
- Focus position and diameter
- Real-time M^2, Pointing, and Divergence
- Measure divergence of well-collimated beam in real-time with BeamMap2-Collimate
- Identify focus with ±1 µm repeatability (beam dependent)
- Optional LensPlate2 for reaching inaccessible beam waists and reimaging waveguides

Applications

- Very small laser beam profiling
- Optical assembly and instrument alignment
- OEM integration
- Lens focal length testing
- Real-time diagnosis of focusing and alignment errors
- Real-time setting of multiple assemblies to the same focus

True2D Slits

- 0.4 µm thick metallic multilayer films on a sapphire substrate
- Advantages over air slits
  - Avoid tunnel effect
  - Air slits are typically deeper than they are wide, and can buckle under high irradiance
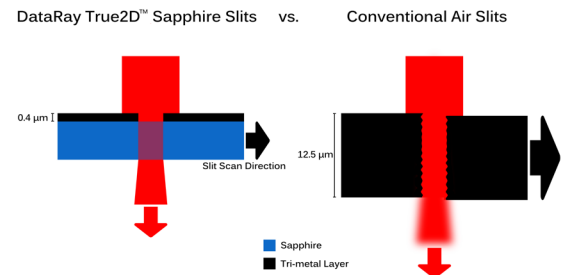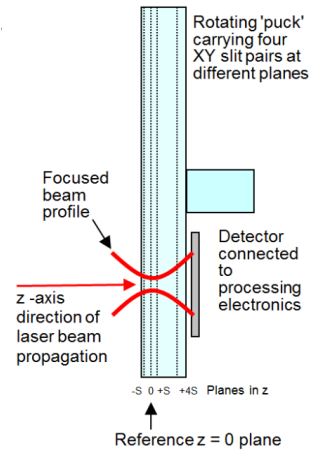
Specifications

Parameter	Specification	BeamMap2	Beam'R2	Comments
Wavelength options:	190-1150 nm, 650-1800 nm, 190-1800 nm, 190-2500 nm	Yes	Yes	Si, InGaAs, Si + InGaAs, Si + InGaAs, extended
Scanned beam diameters:	2 µm to 4 mm (2 mm for IGA-X.X)	Yes	Yes	
X-Y Profile & Centroid Resolution: Accuracy:	0.1 µm or 0.05% of scan range ± <2% ± ≤0.5µm	Yes	Yes	
CW or Pulsed	CW, Pulsed Minimum PRR ≈ [500/(Beam diameter in µm)]kHz	Yes	Yes	
Beam alignment:	± 1 mrad with BeamMap2 Colli-Mate	Yes	-	Beam Dependent
M^2 measurement:	1 to >20, ± 5%	Yes	-	4 Z-plane hyperbolic fit
Real-time update:	5 Hz	Yes	Yes	Adjustable 2-12 Hz
Maximum Power & Irradiance:	1 W Total & 0.3 mW/µm²	Yes	Yes	Metallic film on Sapphire slits
Gain Range:	32dB	Yes	Yes	12-bit ADC
Display graphics:	All: X-Y position; Profiles. BeamMap2 only: M^2, Focus; Divergence, Boresight/Pointing			