



## *BI-200SM*

### Dynamic and Static Light Scattering System

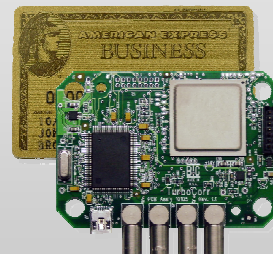
- Nanoparticle Characterization
- Particle Size Distributions
- Protein & Polymer Characterization
- Molecular Weight
- Complex Fluid Characterization



The Brookhaven Instruments' **BI-200SM** system opens the door to the rich fields of exploration of both Static Light Scattering (**SLS**) and Dynamic Light Scattering (**DLS**).

The **BI-200SM** Research Goniometer System provides access to these studies with an automatic, modular and versatile system. It is a precision instrument designed for exacting scattering measurements. Based on a special turntable with precision ball bearings and stepping motor, the **BI-200SM's** modern design and quality construction guarantee precise measurements due to the wobble-free movement of the detector. It is field proven in thousands of laboratories. It is ideal for molecular studies and submicron particle sizing.

Brookhaven Instruments' scientists have extensive experience in the development of instruments and methods for light scattering and this experience has been incorporated into the **BI-200SM** to make it the finest instrument available for research applications of light scattering.



#### **TurboCorr Digital Correlator Features at a Glance**

- USB Communications
- Compact Size, low power requirements (less than 300 mW)
- Auto & cross-correlation modes
- Up to 522 hardware channels
- Sampling time 25 ns to 40 ms
- Delay range 25 ns to 1,310 s
- 100% efficient, real-time operation over the full delay time range

## Special Features of the *BI-200SM* Research Goniometer System

### Both DLS and SLS Modes

Correlation & Intensity Measurements

### Large Angular Range

8° to 155° with 25 mm cells: 15° to 155° with 12 mm cells

### Fine Adjustment Control

Read angle to 0.01° directly on large, fine-control knob

### Open Design/Standard Optical Rails

Facilitates user customizations for special purposes

### Temperature Control

Automatic heating and cooling with internal probe and any standard external circulator

### Isolated Circulation System

Separate temperature and filtration plumbing

### Special Design Glass Vats

Specially polished entrance window ensures minimum flare

### Alignment Cell

Fine-screw vertical adjustment makes center of rotation easier

### Multiple Laser Line Filters

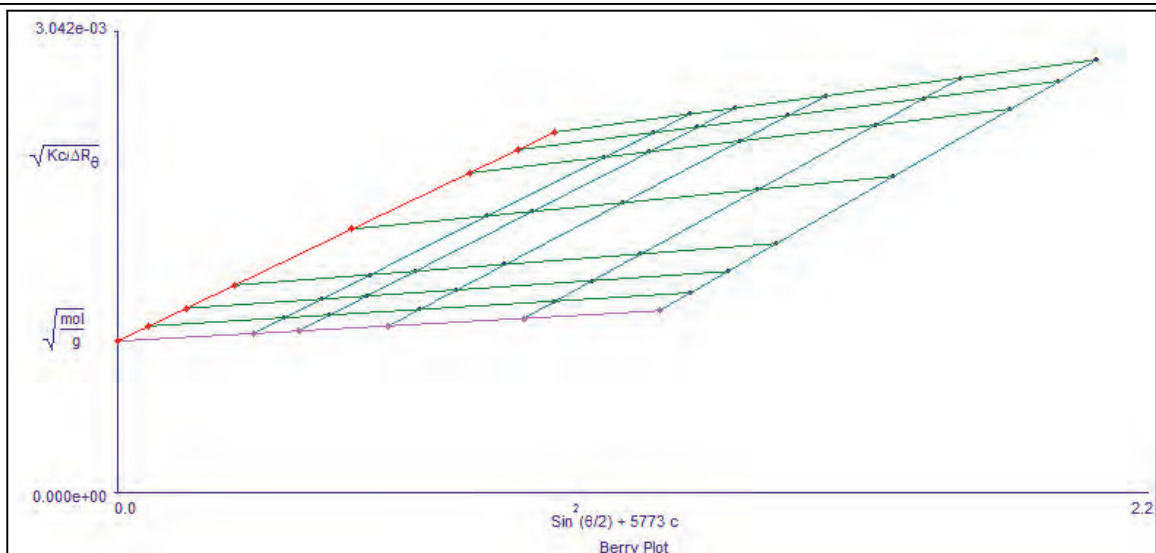
Filter wheel with 632.8 (HeNe), 514.5/488.0 nm (Ar+), one open position for weak scatterers, and 2 blank (shutter) positions. Also available with 532 nm band-pass filter

### Enhanced Viewing Optics

Coated, precision achromats coupled with behind-the-silt viewing and high quality eyepiece make alignment easier

### Variety of Cell Holders

High precision cell holders, standard, low-ribose round cells available: 27.5 mm dilution vials fit cell holder sleeve—Special small-volume cell available



An example of a Berry plot produced by the *BI-200SM*

In the field of **DLS** the dynamics of the scattered light are quantified and analyzed. The short-term intensity fluctuations (dynamics) of the scattered light arise from the fact that the scattering particles are undergoing rapid thermal motions. These movements are called Brownian motion and they cause short term fluctuations in the intensity of the scattered light.

### Typical DLS Applications

- Particle size distribution
- Particle aggregation phenomena
- Micellar systems
- Micro-emulsion technology
- Colloid behavior
- Vesicles & liposomes
- Plasmid DNA's
- Particle size growth
- Nucleation processes & protein crystallization

### Mini-L30

The **Mini-L30** is a small, stand-alone, red laser diode assembly with superb temperature and power stabilization. It can be used with Brookhaven's **BI-200SM** goniometer for dynamic and static light scattering. With nominal 35 mW power at a wavelength of 637.6 nm, it is an ideal replacement for the traditional 35 mW, HeNe laser (632.8 nm) when space is at a pre-



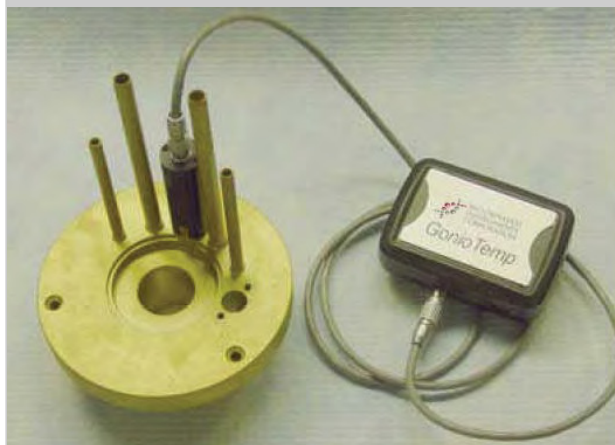
mium.

#### Features at a Glance

- 30 mW, 637 nm
- Compact Diode Laser, 11 cm in length
- TEM001, stabilized, calibrated
- For use in SLS/DLS

### BI-200SMPt

The **BI-200SMPt** allows direct measurement of the temperature in the index matching liquid near the sample cell. It is no longer necessary to assume the temperature of the external circulator is the same as the cell temperature. Values updated every second in 32-bit, BI-DLSW software and used in calculations. A USB cable is provided that connects the data interface shown (left) to the PC. Power for the Pt is supplied through this same cable. **BI-200SM** goniometers supplied after August 2006 are ready to accept the screw-in thermometer. Goniometers delivered earlier will require a manifold swap. Careful removal and replacement of a manifold will not disturb alignment. Contact the factory for more information.



#### Features at a Glance

- USB powered
- Direct measurement in vat
- Fully integrated with 32-bit, constant current

In **SLS** mode, time-averaged intensity measurements are made - at either fixed or variable angles - in the range of 8° to 155° and analyzed with software provided for the methods of Zimm, Berry, Debye, Guinier, Kratkey, etc.

### Typical SLS Applications

- Mw Molecular weight determinations
- R<sub>G</sub> Radius of gyration
- A<sub>2</sub> determination of second virial coefficient
- Micro-emulsion technology
- Colloid behavior complex fluid characterization
- Emulsion polymerization
- Particle size growth nucleation processes

# BI-200SM

Research Goniometer for Static and Dynamic Light Scattering Analysis

## Specifications

Beam Focus and Steering Lenses	Includes mounts, adjustments, and apertures.
Turntable	200 mm O.D. turntable, worm gear and ball bearings; manual or automatic selection of angles in 0.01 ° steps; precision machined base with mounting holes; positioning table with micrometer adjustments.
Specimen Cell Assembly	Including thermal enclosure, centering adjustments, separate plumbing for temperature control and index matching liquids, round cell holders, square cell holder and alignment cell.
Index Matching Vat	With optically flat and specially polished entrance window; precision machined and annealed to minimize stray light.
Periscopic Beam Stop	Located inside vat to prevent flare from exit windows; provided with coupling for use with optional, zero-angle reference detector.
Mean Detector Optics	Entrance aperture of 3mm. Coated, adjustable achromat for focusing scattered light onto 200 μm slit. Slit position adjustable. Reflex mirror and high quality eye piece for viewing scattering region through slit. Filter turret with 632.8, 514.5, 488.0 nm, 2 closed positions, and 1 open position. Other filters available. Secondary pinhole turret: 100, 200, and 400 μm pinholes for DLS measurements; 1, 2, and 3 mm pinholes for SLS measurements/
BI-200SMPt	Allows direct measurement and control of temperature in the index matching liquid, -25 °C to + 155 °C.

## Standard Accessories

BI-TCD	Temperature controller, external circulator type -20 to 100 °C, alphanumeric setting and readout, ± 0.1 ° stability
BI-FC	Filtration/circulation system for index matching liquid. New gear pump and rigid Teflon tubing
BI-RC12	Nominal 12 mm O.D. round glass cell, polyethylene cap
BI-LRM	Laser rail and mounts for most lasers. Lasers are frequently supplied by the user
BI-RC27	Nominal 27.5 mm O.D. dilution vials, package of 100 with HDPE screw caps
BI-SFS	Sample filtration system provides a fast and convenient way to clean your light scattering samples
BI-APD	Avalanche photo diode, up to 10 times the sensitivity

## Options

BI-TCA	Temperature controller, external circulator type, -20 to 100 °C, analog setting and readout, ± 0.2° stability
BI-SC	10 mm path length glass square cell & PTFE cap
BI-RC25	Nominal 25 mm O.D. round quartz cell, dual Teflon tops, mounting ring
BI-PA	Polarization analyzer, Glan-Thompson prism, 5 x 10 <sup>-6</sup> extinction, 2 position mount
BI-CrossCorr	Eliminates detector artifacts by cross correlation
BI-SVC	Small volume cell for precious samples
BI-HV	High voltage power supply
BI-Spec/Adap	Inquire about adapting parts of your existing light scattering systems

*A policy of continual improvement may lead to specification changes.*



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