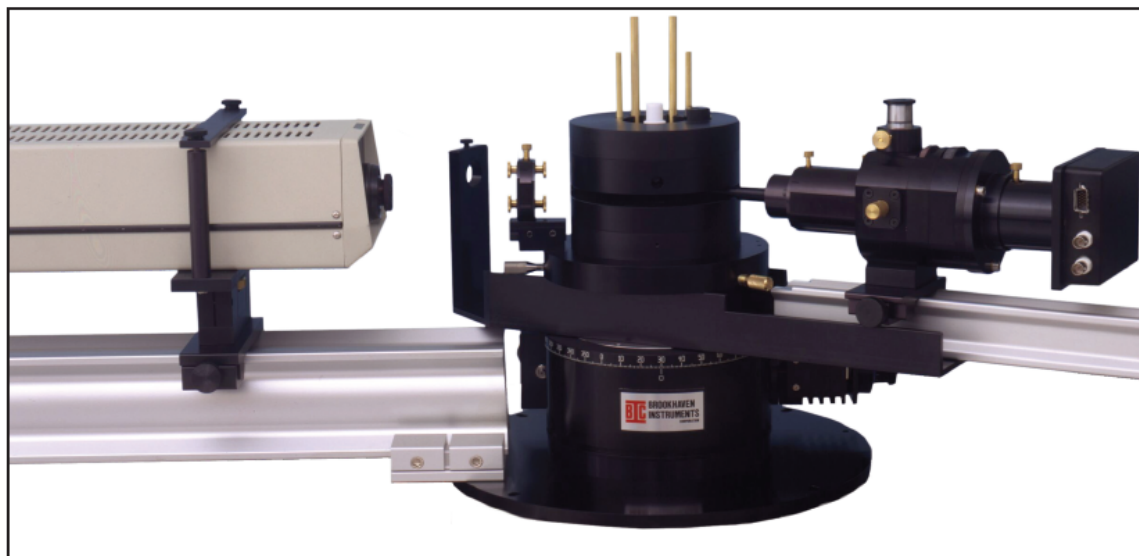


## Research Goniometer for Static and Dynamic Light Scattering Analyses



In static light scattering, intensity of the scattered light is measured by a detector at different angles. The angle at which the intensity of the light is measured gives the length scale probed by the instrument. In a dynamic light scattering measurement, the time-dependent fluctuations in the scattered light are measured by a fast photon counter. The fluctuations are directly related to the rate of diffusion of the molecule through the solvent. Therefore, the fluctuations can be analyzed to determine a hydrodynamic radius for the sample.

BI-200SM (Research Goniometer and Laser Light Scattering System) consists of following major components):

1. Goniometer : It is 200mm turntable mounted on circular base with holes for mounting it on a supporting table. It is motor driven selection of angles with  $0.01^\circ$  steps. The purpose of using goniometer is to collect the scattered rays at different angles, so APD is mounted on it to detect the photons at different angles. The rotation range is  $15^\circ$ - $150^\circ$ .
2. He-Ne Laser source(max. power 35W): It is used to produce Laser rays of 637nm wavelength. It is mounted on laser rail so that it can do to and fro motion.
3. Avalanche Photodiode Detector (APD): It is used to detect the photons by using photo diodes.
4. Sample cell assembly: It is an insulated, anodized metal pot with special glass vat, which contains an index matching liquid (generally Decaline is used as its refractive index is similar to glass vat).
5. BI-9000AT: It is an entirely digital, high speed, signal processor which can be used as an auto or cross correlator for DLS measurements as well as static light scattering. It operates entirely in real-time at 100% efficiency over 10

decades in delay time. The correlator is located on one ISA-compatible card that fits into a PC.

#### Applications:

1. In the static light scattering mode, time-averaged intensity measurements are made - at either fixed or variable angles - in the range from  $8^\circ$  to  $155^\circ$  and analyzed with software provided for the methods of Zimm, Berry, Debye, Guinier, Kratky etc. Such evaluations using measured angular or concentration dependencies of the intensity of the scattered light provide key information for those interested in the such topics as:
  - i)  $M_w$  Molecular weight determinations
  - ii)  $R_g$  Radius of gyration
  - iii)  $A_2$  Determination of second virial coefficient
  - iv) Micro-emulsion technology
  - v) Colloid behavior
  - vi) Complex fluid characterization
  - vii) Emulsion polymerization
  - viii) Particle size growth
  - ix) Nucleation processes
  
2. In dynamics light scattering, intensity fluctuations (dynamics) of the scattered light arise from the fact that the scattering particles are undergoing Brownian motion. From these dynamic light scattering measurement many interesting subjects may be explored, among them:
  - i) Particle size distributions
  - ii) Particle aggregation phenomena
  - iii) Micellar systems
  - iv) Micro-emulsion technology
  - v) Colloid behavior
  - vi) Vesicles & liposomes
  - vii) Plasmid DNA's
  - viii) Particle size growth
  - ix) Nucleation processes & protein crystallization

Cost of the equipment: USD 63,725

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