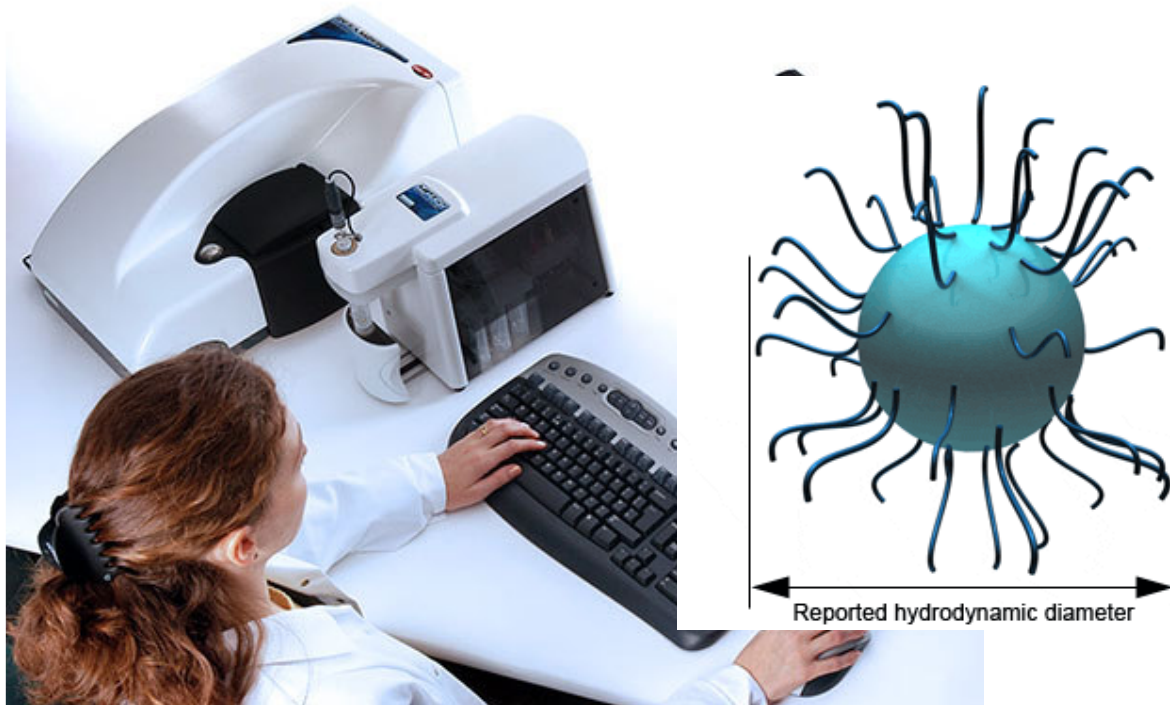


# Dynamic Light Scattering (DLS)

Make: Malvern Instruments, Model: Zetasizer



## Size Characterization of Proteins, Polymers and Colloidal Dispersions

**Dynamic light scattering (DLS)**, sometimes referred to as **Photon Correlation Spectroscopy (PCS)** or **Quasi-Elastic Light Scattering (QELS)**, is a non-invasive, well-established technique for measuring the size of molecules and particles typically in the submicron region, and with the latest technology lower than 1 nanometre.

## Applications of Dynamic Light Scattering

Typical applications of Dynamic Light Scattering are the measurement of the size and size distribution of particles emulsions and molecules dispersed or dissolved in a liquid. e.g.: pProteins, polymers, micelles, carbohydrates, nanoparticles, colloidal dispersions, emulsions, ions

## Principle behind Dynamic Light Scattering

Particles, emulsions and molecules in suspension undergo Brownian motion. This is the motion induced by the bombardment by solvent molecules that themselves are moving due to their thermal energy.

If the particles or molecules are illuminated with a laser, the intensity of the scattered light fluctuates at a rate that is dependent upon the size of the particles as smaller particles are "kicked" further by the solvent molecules and move more rapidly. Analysis of these intensity fluctuations yields the velocity of the Brownian motion and hence the particle size using the Stokes-Einstein relationship.

## What does Dynamic Light scattering actually measure?

The diameter that is measured in Dynamic Light Scattering is called the hydrodynamic diameter and refers to how a particle diffuses within a fluid. The diameter obtained by this technique is that of a sphere that has the same translational diffusion coefficient as the particle being measured.

The translational diffusion coefficient will depend not only on the size of the particle "core", but also on any surface structure, as well as the concentration and type of ions in the medium. This means that the size can be larger than measured by electron microscopy, for example, where the particle is removed from its native environment.

## Technical Specification

- Accurate, reliable and repeatable particle size analysis in one or two minutes
- Measurement in the native environment of the material
- Mean size only requires knowledge of the viscosity of the liquid
- Simple or no sample preparation, high concentration, turbid samples can be measured
- Simple set up and fully automated measurement
- Size measurement of sizes < 1 $\mu$ m
- Size measurement of molecules with MW < 1000Da
- Low volume requirement (as little as 12 $\mu$ L)
- Temperature dependent measurement range : 4 deg-90 deg