

DLS Rules of Thumb

SIGNAL / NOISE

Ultimate sensitivity is determined by signal to noise ratio. Look for at least 150% of the clean water count rate (CWCR) before collecting data. Typical CWCR, 17k/s (quartz), 30k/s (BladeCell)

OPTIMIZE COUNT RATE

Use the intensity control slider to achieve 300 ~ 500k/s. Less than this is acceptable but consider increasing acquisition time for count rates below 100k/s. More than 2-3000k/s and the (expensive) photon counter begins to overload.

OPTIMIZE ACQUISITION TIME

Try to collect at least 1M (signal) photons in total. For count rates of 500k/s just a few seconds is enough. Near the lower limit try to extend acquisition times.

STABLE COUNTS GOOD

The best quality DLS result from very stable count rates throughout the acquisition period. +/- 20% variation is OK. +/-50% variation or more... BEWARE!

HIGH, STABLE COUNTS = GREAT!

LOW, STABLE COUNTS = GOOD!

HIGH, UNSTABLE COUNTS = BAD!*

LOW, UNSTABLE COUNTS = GIVE UP?*

*Count rate instability is often caused by aggregation, so don't be disheartened if the count rate is highly unstable. The DLS system may not produce repeatable results but it is still telling you something valuable about your sample...

CHECK the PDI

A low polydispersity index, PDI tells you the sample has a narrow size distribution.

< 0.1 means highly monodisperse (e.g. certified standards)

0.1 ~ 0.25 means a narrow distribution with few aggregates

>0.25 polydisperse with significant aggregate content

DISREGARD SMALL PEAKS

Intensity distribution peaks in the >1000nm size range having less than about 5% total area can generally be disregarded (baseline noise). Peaks of less than 0.3nm can also be ignored (intrinsic/solvent noise).