Fluorescence Correlation Spectroscopy (FCS) is a powerful tool for investigating fluorescently labeled molecules in solution to obtain data about molecular size and concentrations. However, over many years FCS has suffered from many unavoidable technical artefacts which limited the reproducibility and quantitative precision of the method [1]. Recently, several new variants of FCS have been developed (z-scan FCS, dual-focus or 2fFCS [2,3], line-scan or rotating-focus FCS) which exhibit a much higher measurement precision and allow to measure diffusion coefficients close to the infinite dilution limit in a reference-free and absolute manner. Another powerful extension of FCS is dual-color fluorescence cross-correlation spectroscopy (dcFCCS) [4] which is a powerful tool for studying molecular interactions at nanomolar concentration. I present the technical basis of FCS, 2fFCS and dcFCCS and present numerous applications of these techniques in physical chemistry and biology [5-11].

References


