

HIGH-SPEED SPATIALLY RESOLVED FLUORESCENCE CORRELATION SPECTROSCOPY

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We simulate and experimentally demonstrate 1D spatially-resolved high temporal resolution Fluorescence Correlation Spectroscopy (FCS) of biological samples using a Streak Camera for detection. Our approach involves measuring a superposition of periodically spaced intensity time-traces, which can allow one to obtain high-frequency dynamics not accessible using conventional detectors. These can be obtained over an entire 1D spatial axis in parallel, allowing one to study their spatial heterogeneity and offering the possibility to additionally derive longer-scale temporal dynamics via e.g. spatio-temporal correlation analysis. The approach paves the way for imaging-FCS of fast molecular dynamics, which is currently limited by the minimum continuous acquisition times of pixel-arrays and the associated electronics.