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Fluorescence cross-correlation with N-channel photon counting logic

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Richard Pan, William W Mantulin, and Enrico Gratton.

Fluorescence cross-correlation with n-channel photon counting logic.

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Biophys J. 1999; 76(1 Pt 2).

Abstract

A novel digital logic design, combines the versatile strengths of FCS with independent, synchronized, multiple channel recording of photon pulses or common clock pulses. Precise transport and thermodynamic phase phenomena, requiring high confidence in event detection and timing (less than 1 microsecond) can thus be studied. In Photon Counting Mode, a clock gates photon counting in the respective channels, thus allowing anisotropy and general polarization experiments. In Clock Counting Mode, photons at different wavelengths, from respective channels, gate counting of common clock pulses. At present, two channels have been designed and built. Testing of channels (calibration with standards, determination of deadtimes), experiments with polymers (DNA, etc.) in different phases, and N=4 channels is planned. Experimental data will be studied via scaling physics, photon counting and averaging, physics of phase transitions and theory of wavelets.