Abstract Submitted
for the 4CF14 Meeting of
The American Physical Society

Fluorescence Fluctuation Analysis for Rapid Dimerization Kinetics: A Model Study JAMES THOMAS, Univ of New Mexico — Fluorescence Correlation Spectroscopy (FCS) is a widely-used biophysical technique for characterizing the density and diffusion of fluorescently-labeled cellular constituents, such as proteins or lipids. Using two detection channels and two fluorophores with distinct emission spectra, dimerization is also readily detected and measured. The kinetics of binding and unbinding, on the other hand, present essentially no detectable signature in auto- and cross-correlation traces. Using numerical simulations of diffusion and dimerization on a lattice, we show that the use of a rotating illumination profile readily allows the separation of diffusion and reaction kinetics in FCS, provided the reaction rates are fast compared with the diffusion time (which can be increased by enlarging the illuminated area.) Dynamic illumination is thus a promising approach to determining rapid dimerization rate constants on biological specimens.

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Date submitted: 12 Sep 2014 Electronic form version 1.4