Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Fluorescence correlation spectroscopy with Gaussian-Lorentzian volumes MICHELE MARROCCO, ENEA — Fluorescence correlation spectroscopy (FCS) is a fundamental technique of fluorescence microscopy used for many applications of chemical physics where molecular diffusion plays primary roles [see, for example, O. Krichevsky and G. Bonnet, Rep. Prog. Phys. 65, 251 (2002)]. The milestone of FCS is called three-dimensional Gaussian (3DG) approximation. According to this assumption, the observation volume is modeled by Gaussian profiles along the main three spatial directions. This simplification is necessary to achieve analytical treatment of FCS measurements. In this work, analytical solutions are shown for another geometry corresponding to the fundamental mode of laser beams, i.e. the Gaussian-Lorentzian distribution, where Gaussian profiles are associated with the two transverse directions while a Lorentzian dependence characterizes the axial direction (coincident with the optical axis of the microscope). Analytical solutions are guaranteed for both one-photon and two-photon excitations of diffusing molecules [one-photon excitation is considered in M. Marrocco, Chem. Phys. Lett. 449, 227 (2007)]. Similarities and differences with respect to the 3DG approximation are discussed.

Michele Marrocco
ENEA

Date submitted: 27 Nov 2007 Electronic form version 1.4