

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Fluctuations in Intensity in disordered media as a New Sub-wavelength Microscopy Tool GABRIEL CWILICH, Department of Physics, Yeshiva University, JUAN JOSE SAENZ, Departamento de Fisica de la Materia Condensada, Universidad Autonoma de Madrid — The intensity-intensity correlations of waves that propagate coherently through a disordered system are discussed, in the mesoscopic scale. Since many of the properties of those correlations are independent of the transport regime (ballistic, diffusive or localized) they can be discussed using the macroscopic approach of random matrix theory [1]. In that framework we have considered the problem of multiple sources emitting simultaneously in a disordered medium, and we will show that the correlations and even the intensity fluctuations at a fixed point outside the turbid system can provide useful information about both the relative position of the sources and their coherence. Moreover, the information obtained is relevant at subwavelength lengths, opening the possibility of new applications to fluorescence studies, communications and image processing in turbid environments, complementary to traditional techniques.

[1] G. Cwilich, L. Froufe, J.J. Saenz, Phys Rev E74, 045603 (R) (2006)

Gabriel Cwilich
Department of Physics, Yeshiva University

Date submitted: 22 Nov 2011

Electronic form version 1.4