Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Heterogeneous fluorescence intermittency in single layer reduced graphene oxide[1] JIXIN SI, Univ of Notre Dame, SANDOR VOLKAN-KACSO, California Institute of Technology, AHMED ELTOM, Oliver Wyman, YURII MOROZOV, Univ of Notre Dame, MATTHEW P. MCDONALD, Max Planck Institute for the Science of Light, ANTHONY RUTH, MASARU KUNO, BOLDIZSAR JANKO, Univ of Notre Dame — Fluorescence intermittency, or blinking, has been observed in a wide range of systems, including quantum dots, nanorods, and nanowires. Striking similarities have been documented in the optical response of these nanoscale emitters. However, the mechanism behind blinking still remains elusive. For the first time, blinking has been observed in a two-dimensional system in recent experiments on reduced graphene oxide (rGO). Here we reveal the power spectral density (PSD) of the blinking in rGO shares the same 1/f-like behavior of previously known blinking systems; meanwhile, the heterogeneous dynamic evolution and spatial correlation make rGO a unique blinking system. To investigate the origin of blinking, we self-consistently explain the evolution of rGO blinking using the phenomenological multiple recombination center (MRC) model that captures common features of nanoscale blinking. Furthermore, tight binding method and ab-initio method calculations of carbon nanodots are utilized to look for the microscopic structure corresponding to the RCs in the MRC model.

[1]M. K. thanks the American Chemical Society Petroleum Research Fund, the Army Research Office (W911NF-12-1-0578) for support. B.J. was supported in part by the U. S. DOE, Office of Science, Office of Basic Energy Sciences, under contract W-31-109-Eng-38.

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Date submitted: 06 Nov 2015 Electronic form version 1.4