

Abstract Submitted  
for the NWS11 Meeting of  
The American Physical Society

**Multiplexed fluorescence spectroscopy with holographic optical tweezers**<sup>1</sup> M.A. CIBULA, M.J. KENDRICK, D.S. GRUSS, V. BYCHKOVA, N. PYLYPIUK, M. KOESDJOJO, V.T. REMCHO, O. OSTROVERKHOVA, D.H. MCINTYRE, Oregon State University — We present a multiplexed spectroscopy technique using holographic optical tweezers to trap and excite multiple sensor particles. Our goal is to develop a lab-on-a-chip measurement platform for monitoring pH and other ion concentrations with high spatial resolution in a microfluidic device or within biological cells. We have developed a variety of polymeric pH/ion sensitive nanoparticles with fluorescence spectra that change with the pH/ion concentration of the surrounding environment. We optically trap and manipulate multiple nanosensors using holographic optical tweezers. The trapped particles are irradiated with a separate excitation laser and the fluorescence from all the particles is detected simultaneously with an imaging spectrometer. Electronic separation of the parallel, discrete spectra allows for concurrent determination of multiple spectra.

<sup>1</sup>Supported by ONR grant N00014-07-1-0457.

David McIntyre  
Oregon State University

Date submitted: 21 Sep 2011

Electronic form version 1.4