Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Crystal Structure Anisotropy Explains Anomalous Elastic Properties of Metal Nanorods SERGUEI GOUPALOV, Jackson State Univ — It is demonstrated that the frequency of the extensional vibrational mode of a nanorod made of an elastically anisotropic crystalline material deviates widely from the predictions of the theories based on the analysis of the long-wavelength limit. The dispersion relation for the fundamental extensional mode of a gold rod grown in the [100] direction is calculated and found to be in an excellent agreement with experimental data obtained from the transient optical absorption measurements on gold nanorods.[1] This explains an anomaly in the elastic properties of nanorods which was previously attributed to a 26% decrease in Young's modulus for nanorods compared to its bulk value.

[1]H. Petrova, J. Perez-Juste, Zh. Zhang, J. Zhang, T. Kosel, and G.V. Hartland, J. Mater. Chem. **16**, 3957 (2006)

Serguei Goupalov
Jackson State Univ

Date submitted: 10 Nov 2013 Electronic form version 1.4