Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Direct measurement of the elastic properties of the Wiseana Iridovirus (WIV) capsid using Brillioun Spectroscopy STEPHEN WARGACKI, Air Force Research Laboratory, R.D. HARTSCHUH, H. XIONG, J. NEISWINGER, A. KISLIUK, A.P. SOKOLOV, University of Akron, E.L. THOMAS, T GORISHNYY, Massachusetts Institute of Technology, V.K. WARD, University of Otago, New Zealand, R.A. VAIA, Air Force Research Laboratory — Viral capsids are of great interest for their potential as templates or scaffolds to direct the growth of secondary structures for various sensing, energy harvesting, and photonic devices. However, due to their size (10's-100's nms) and complex structure (symmetrically repeating protein subunits); the mechanical properties of viruses and viral films has yet to be directly measured. We measured the phononic spectra of virus capsids assembled on silicon substrates using Brillioun Light Scattering at different scattering wave vectors. The phononic spectrum provides a direct measurement of the mechanical properties of individual viruses as well as that of the collective assemblage. The spectra are analyzed to understand the origins of both the propagating phonons as well as those that remain localized within individual viruses. Understanding the mechanical properties of the viruses is critical for the reliable utilization of viral technologies, as well as contributing to the understanding of the impact of capsid flexibility and rigidity on cellular infection by viruses.

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Date submitted: 26 Nov 2006 Electronic form version 1.4