

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Scanning tunneling microscopy study of the assembly  
and structure of filamentous virus M13 bound to graphite**

PRASHANT SHARMA, Department of Physics, Suffolk University, Boston, MA 02114 — Viruses are an important class of biomaterials used for placing nano particles on inorganic substrates. To accomplish greater control over viral assembly on a substrate it is important to determine the in situ nanoscale structure of the viral protein coat. Scanning tunneling microscopy offers the unique potential for determining the structure and arrangement of the proteins of a virus adsorbed on a conducting substrate. In this work, I develop an experimental technique for isolating and studying M13 viruses that bind to graphite. Using scanning tunneling microscopy in ambient conditions I obtain the correct lateral dimension of the virus and the periodicity of its protein structure when it is bound to graphite. I also analyze the tunneling conductance fluctuations in these measurements and introduce a simple model for tunneling through an assembly of proteins to obtain an accurate estimation of the vertical dimension of a virus bound to a conducting substrate. I discuss broader implications of this scanning tunneling microscopy study for the in situ structure determination of other biomolecules.

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Date submitted: 11 Nov 2011

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