Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Assembly of Viruses and the Pseudo Law of Mass Action ALEXANDER MOROZOV, ROBIJN BRUINSMA, JOSEPH RUDNICK, Dept of Physics and Astronomy, UCLA — The self-assembly of the protein shell ("capsid") of a virus is believed to obey the Law of Mass Action (LMA) despite the fact that viral assembly is not a reversible process. In this paper we examine a soluble model for irreversible capsid assembly, the "Assembly-Line Model." We show that, in this model, viral assembly from a supersaturated solution is characterized by a shock front propagating in the assembly configuration space from small to large aggregate sizes. If this shock front is able to reach the size of an assembled capsid, then transient state develops characterized by a "pseudo" LMA. This pseudo LMA describes partitioning of capsid proteins between assembled capsids and a metastable, supersaturated solution of free proteins that decays logarithmically slowly. We show that the line energy of assembly intermediates is the key parameter that determines this metastable state.

Robijn Bruinsma
Dept of Physics and Astronomy, UCLA

Date submitted: 14 Nov 2008 Electronic form version 1.4