PHYSICS AND ASTRONOMY
COLLOQUIUM

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"The Physics of Virus Self-Assembly"

Abstract

Simple viruses consist of RNA and proteins that form a shell (called a capsid) that protects the RNS. The capsid is highly ordered, with the proteins being arranged in an icosahedral shell. Many simple viruses are self-assembled: you can mix the RNA and the capsid proteins in a test tube, and they will spontaneously form infectious viruses (don't worry – none of the viruses I will discuss will infect you, unless you are a plant or bacterium). To understand how this self-assembly process happens, we do experiments on a much larger, model system: attractive colloidal particles on the surface of a sphere. On the curved droplet surface, the particles form branched networks of slender domains, a consequence of an elastic instability. These results show that Gaussian curvature can fundamentally alter the growth and shape of ordered domains, which suggests that the viral assembly pathway may be anything but trivial. I will conclude by discussing new optical experiments that attempt to resolve the dynamics of assembly of a single viral capsid.

Wednesday, September 30, 2015
3:00 p.m.
Elliott Building
Room 167