

# Physics of virus assembly

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Despite the proliferation of viruses in nature, the mechanisms by which hundreds or thousands of proteins assemble to form structures with icosahedral order (IO) is completely unknown. In this talk, I will discuss the results of our simulations of a minimal model and show that the mechanical properties of building blocks including the spontaneous curvature, flexibility and bending rigidity of coat proteins are sufficient to predict the size, symmetry and shape selectivity of the assembly products. Further, using continuum elasticity theory, I prove that as a spherical cap grows, there is a deep potential well at the locations of disclinations that later in the assembly process will become the vertices of an icosahedron, explaining at least in part, the error-free assembly of protein subunits into capsids with universal IO.