1046-92-317 **Thomas Keef*** (tk506@york.ac.uk), Department of Mathematics, University of York, Heslington, York, YO10 5DD, England, and **Reidun Twarock** (rt507@york.ac.uk), Department of Mathematics, University of York, Heslington, York, YO10 5DD, England. *Hidden symmetries in virus architecture and their implications on virus assembly.*

It has long been recognised that viruses use icosahedral symmetry in the structural organisation of their protein containers that encapsulate and hence provide protection for the viral RNA or DNA. Caspar and Klug used this fact in their seminal work in 1962 to predict the numbers, types and relative orientations of the protein clusters in the capsids. However, predictions on the three-dimensional structure of individual capsid proteins and the packaged genomic material are inaccessible with their approach. We introduce here a new symmetry principle based on affine extensions of the icosahedral group that accounts for the radial distribution of all material boundaries in simple RNA viruses. These results show that the structure of the protein container of a virus and that of the packaged RNA are collectively constrained by symmetry, and that symmetry is hence more important for virus architecture than previously appreciated. As an application of these results, models for virus assembly are discussed. (Received August 26, 2008)