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Two-Dimensional Crystals of Icosahedral Viruses at Liquid interfaces MASAFUMI FUKUTO, LIN YANG, ANTONIO CHECCO, Brookhaven National Laboratory, IVAN KUZMENKO, Argonne National Laboratory, QUYEN NGUYEN, NICK MANK, QIAN WANG, University of South Carolina — Two-dimensional (2D) assembly of turnip yellow mosaic virus (TYMV) on cationic lipid monolayers is investigated at the air-water interface. TYMV, an icosahedral virus with a diameter of 28 nm, exhibits well-defined roughness, charge distribution, and hydrophilic/hydrophobic patches on its surface. The electrostatic attraction to the lipid-coated aqueous interface provides means to impose a specific virus orientation and hence reduce the number of possible inter-particle interactions. The 2D geometry is particularly advantageous in dissecting the role of anisotropy in aqueous-media assembly, which involves various types of similarly weak interactions. We show that the assembly approach used not only facilitates crystallization but also provides insights on how complex anisotropic interactions can be exploited to generate long-range order. Specifically, we report an *in situ* x-ray scattering observation of novel 2D crystal forms of TYMV that reflect the virus' icosahedral symmetry. The symmetry, shape, and surface heterogeneities of TYMV suggest a mechanism by which these crystals are stabilized by a combination of hydrophobic, electrostatic, and steric interactions.

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