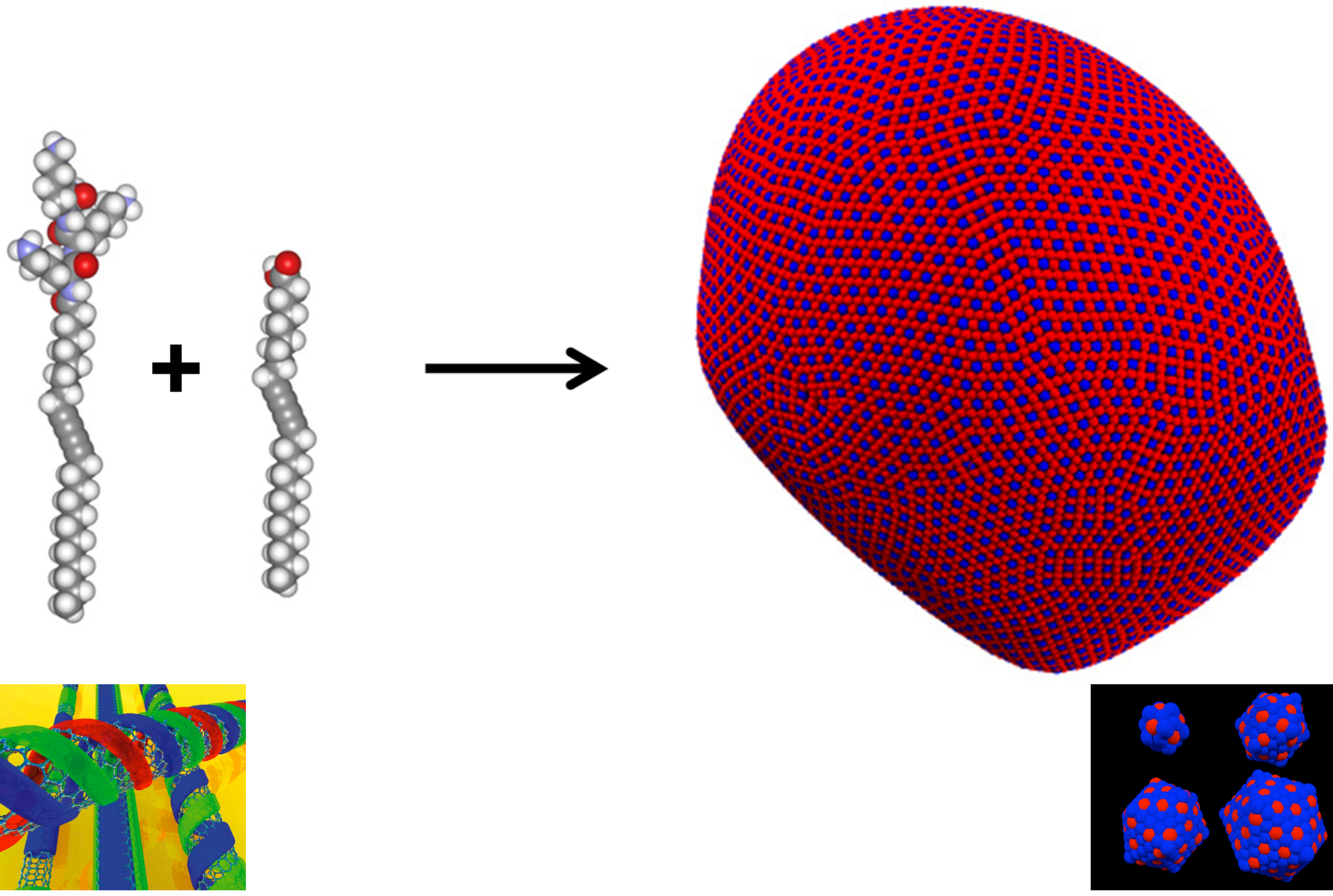
Boston University Physics Colloquium



Ionic Driven Self-Assemblies: Patterns and Symmetries

Chiral structures at the nanoscopic level are ubiquitous in nature. Helical structures are quintessential examples of chirality and spontaneously arise in collagen, actin, viruses and synthetic materials at the nanometer scale. Using electrostatic forces we are able to show the formation of helical patterns on the surface of cylindrical fibers or porous aqueous channels. Furthermore, through a straightforward approach we control the strength of the electrostatic interactions through the concentration of ions and the dielectric constants of the media thereby having a mechanism to pattern the surface of fibers or channels into helical patterns with different pitch angles. In spheres, on the other hand, ionic correlations may lead to buckling. This novel electrostatic driven faceting mechanism of ionic shells into icosahedra breaks spherical, icosahedral and rotational symmetries due to different arrangements of the charged components amongst the facets. This buckling appears on vesicles of cationic-anionic molecules, which we synthesize and analyze by x-rays scattering, as well as in oppositely charged molecules co-adsorbed onto interfaces, which form ionic rafts.

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January 26, 2010 (Tuesday) at 3:30pm (Refreshments at 3:15pm)

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