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**Funny and Functional Physics: PEC Nanoparticles**

MARTIEN COHEN STUART, Physical Chemistry Soft Matter, Wageningen University, Netherlands

When the tendency of polyelectrolyte complexes to phase separate is judiciously combined with appropriate concepts from the realms of polymer physics and supramolecular chemistry, a wealth of novel self-assembled nanoparticles with original properties can be prepared. This presentation discusses how a high degree of complexity and functionality arises spontaneously, in the form of equilibrium structures, and how these structures can be understood from physical principles. Some promising applications are mentioned as well.