

MAR16-2015-005894

Abstract for an Invited Paper  
for the MAR16 Meeting of  
the American Physical Society

### **Electrostatic Interactions and Self-Assembly in Polymeric Systems<sup>1</sup>**

ANDREY DOBRYNIN, Univ of Akron

Electrostatic interactions between macroions play an important role in different areas ranging from materials science to biophysics. They are main driving forces behind layer-by-layer assembly technique that allows self-assembly of multilayer films from synthetic polyelectrolytes, DNA, proteins and nanoparticles. They are responsible for complexation and reversible gelation between polyelectrolytes and proteins. In this talk, using results of the molecular dynamics simulations and analytical calculations, I will demonstrate what effect electrostatic interactions, counterion condensation and polymer solvent affinity have on a collapse of polyelectrolyte chain in a poor solvent conditions for the polymer backbone, on complexations and reversible gelation between polyelectrolytes and polyampholytes (unstructured proteins), on microphase separation transitions in spherical and planar charged brushes, and on a layer-by-layer assembly of charged nanoparticles and linear polyelectrolytes on charged surfaces.

<sup>1</sup>NSF DMR-1004576 DMR-1409710