**One Hundred Years of Electrified Interfaces: Past, Present and Future**

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The Poisson-Boltzmann theory is a mean-field description of ionic solutions and charge interfaces, and it has been instrumental during the last century to predict charge distributions and interactions between charged macromolecules. While the electrostatic model of charged fluids, on which the Poisson-Boltzmann description rests, and its statistical mechanical consequences have been scrutinized in great detail, much less is understood about its probable shortcomings when dealing with various aspects of real physical, chemical and biological systems. After reviewing the important results of the Poisson-Boltzmann theory, I will discuss several modern extensions and modifications as applied to ions in confined geometries. They include fluctuations and correlations leading to a surprising attraction of like-charged surfaces, the importance of the ion-dipole interaction in aqueous solutions, and finite size of ions and other short-range interactions on ionic profiles and surface tension of electrolyte solutions.