**Title: Strongly Coupled Coulomb Fluids**

The structural constituents of soft- and bio-materials, such as biopolymers, membranes, colloids, are often dissolved in polar solvents (often water) whereby they acquire electric charges over their bounding surfaces and are surrounded by a fluid of mobile charges, known generally as Coulomb fluids. The presence of Coulomb fluids and the interactions mediated by them and, in particular, also the thermal fluctuations and statistical correlations resulting from them play a significant role in the physical properties of charged soft- and bio-materials. Coulomb fluids have been studied theoretically for more than a century, but a complete understanding of their behavior has been missing, due mostly to the formal difficulties arising from the long-range nature of Coulomb interactions and challenges that one encounters in developing a consistent theory for them. However, recent advances in applying field-theoretic methods as well as numerical-simulation techniques have shed light on many unusual aspects of these systems. In these talks, I first provide an overview of the physics of Coulomb fluids and its importance in soft matter and biophysics, and then review some of the theoretical advances that have been achieved in this area in recent years. In particular, I show that Coulomb fluids are described by a highly nonlinear theory and that some of the most peculiar phenomena that occur in reality or have been observed in recent experiments on soft- and bio-materials such as the condensation of DNA in bulk or in viruses and virus-like nano-capsids, formation of large bundles of like-charged biopolymers and other similar like-charge attraction phenomena, all occur in a regime where the Coulomb fluids in these systems are in a "strongly coupled" (or strongly correlated) state. The strong coupling behavior of Coulomb fluids has been understood only very recently and is known for its numerous exotic and counter-intuitive features. I will then discuss various aspects of the theory, as well as numerical simulations, of strongly coupled Coulomb fluids and their recent extensions to a host of realistic situations (such as systems with mixed strongly and weakly coupled components, systems with charge disorder, etc) that were developed by myself and other collaborators since early 2000s, which will include the works done most recently at IPM.