

## Ionic fluids

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## PREFACE

# Ionic fluids

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In spite of its apparent simplicity Coulomb law, when applied to many body systems, leads to an amazingly rich mathematical structure. The simple idea that two similarly charged objects always repel, is not necessarily true in a colloidal suspension or a dusty plasma. Neither can one simply predict the direction of the electrophoretic motion of a polyion from only knowing its chemical charge. Strong Coulomb correlations in ionic fluids result in instabilities very similar to the gas–liquid phase separation observed in atomic fluids. It is fair to say that bulk behavior of simple aqueous monovalent electrolytes is now very well understood. Unfortunately this is not the case for multivalent electrolytes or molten salts. In these systems cation–anion association leads to strong non-linear effects which manifest themselves in formations of tightly bound ionic clusters. In spite of the tremendous effort invested over the years, our understanding of these systems remains qualitative. In this special issue we have collected articles from some of the biggest experts working on ionic fluids. The papers are both experimental and theoretical. They range from simple electrolytes in the bulk and near interfaces, to polyelectrolytes, colloids, and molten salts. The special issue, covers a wide spectrum of the ongoing research on ionic fluids. All readers should find something of interest here.