

Preface

*To my wife, Nélide, who was always a source of love and inspiration. In memory
“Science is an evolution of ideas and approximations,” José A. Fornés, 1998.*

The importance of estimating fluctuations in physics is because they contain a lot of information: Electromagnetic fluctuations are the origin of London (van der Waals) forces (1937) between molecules and Lifchitz forces (1956) between macro-objects. Protonic fluctuations are the origin of Kirkwood and Schumaker forces (1952) between molecules and pH fluctuations (Fornés et al. 1999). Also protonic fluctuations could be the cause of the dielectric increment of proteins in solution. Local electrical fluctuations can influence chemical reactions. Polyelectrolytes are present in almost all the biological systems. In order to understand how these systems work, it is important to know the size of their electrical fluctuations. The present book represents the work the author has performed on this subject while he was professor at the Institute of Physics of Goiás University. I am grateful to my many friends and colleagues. I would like especially to acknowledge the help I received from Amando S. Ito, Joaquim Procopio, and José Nicodemos T. Rabelo, who influenced very much my scientific career, and also the help I received from Salviano de Araújo Leão, who was always ready to help me with computational softwares. Also I want to acknowledge the help I received from Daniel Leite in the design of the figures. Also, I would like to thank to Luis Furtado, Springer’s editor in Brazil, whose perfect orientation and cordial treatment made this book reality. It has been a considerable pleasure to work with him. Finally, I want to express my gratitude to Susan Westendorf, my book project coordinator, Springer Nature, in New York, who always was ready to give a hearty assistance, related to the book production. *March 2016, José Antonio Fornés Instituto de Física UFG, Brazil.* I want to express my recognition to Sarumathi Hemachandirane, Project Manager Publishing SPi Global in India and her Team, for such a careful and perfect job in the production of the book.

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<http://www.springer.com/978-3-319-33839-2>

Electrical Fluctuations in Polyelectrolytes

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2017, VIII, 91 p. 32 illus., 30 illus. in color., Softcover

ISBN: 978-3-319-33839-2