



Protein Physics: A Course of Lectures (Soft Condensed Matter, Complex Fluids and Biomaterials Serie)

By Alexei V. Finkelstein

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Protein Physics is a lively presentation of the most general problems of protein structure, folding and function from the physics and chemistry perspective, based on lectures given by the authors. It deals with fibrous, membrane and, most of all, with the best studied water-soluble globular proteins, in both their native and denatured states. The major aspects of protein physics are covered systematically, physico-chemical properties of polypeptide chains; their secondary structures; tertiary structures of proteins and their classification; conformational transitions in protein molecules and their folding; intermediates of protein folding; folding nuclei; physical backgrounds of coding the protein structures by their amino acid sequences and protein functions in relation to the protein structure. The book will be of interest to undergraduate and graduate level students and researchers of biophysics, biochemistry, biology and material science.

- Designed for a wide audience of undergraduate and graduate students, as well as being a reference for researchers in academia and industry
- Covers the most general problems of protein structure, folding, and function and introduces the key concepts and theories
- Deals with fibrous, membrane and especially water-soluble globular proteins, in both their native and denatured states
- Summarizes and presents in a systematic form the results of several decades of world wide fundamental research on protein physics, structure and folding
- Examines experimental data on protein structure in the post-genome era

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Editorial Review

Review

"It is not always easy to translate a good lecture course into an equally engaging textbook, but Finkelstein and Ptitsyn have succeeded in this difficult task. The twenty-five chapters are not only an accurate and detailed introduction to the physics of proteins, but also remarkably lively. ...the book is a pleasure to read and is well suited both as a textbook used in a course on protein science and as a tool for self-study." --

Ulrich H. E. Hansmann for the BULLETIN OF MATHEMATICAL BIOLOGY, Sept. 2003

"The lectures are unique... anticipating questions from the students, and answering them, with an interspersed of simple examples...a good introduction to protein physics for students, ...will help chemists, physicists, and biologists acquire a widespread knowledge of current issues in protein structure, properties, and reactions." --**Harold A. Scheraga, Todd Professor of Chemistry, Cornell University, USA**

"Protein Physics provides all the essential information. ...concise, reliable and very well written" --**Israel M. Gelfand, Distinguished Professor Rutgers University, USA**

"Rigorous and thorough analysis of physical basis of protein structure...unique in its profound professionalism ... free, colloquial style." --**Alexander S. Spirin, Professor of Biochemistry, Moscow University, Russia**

From the Back Cover

Protein science is at the forefront of the biotechnology revolution. Vast amounts of experimental data on protein structure, folding and action have been accumulated during the past decades and at an accelerated rate in the post-genome era. There is a large and growing number of students and young researchers entering the field and we need to ensure that their research is not impeded by their lack of understanding of the basic physics and physical chemistry behind protein structure and function, in particular behind protein engineering and design.

Protein Physics: A Course of Lectures covers the most general problems of protein structure, folding and function and introduces the concepts and theories. It deals with fibrous, membrane and water-soluble globular proteins, in both their native and denatured states. The book summarizes and presents in a systematic way the results of several decades of worldwide fundamental research on protein physics, structure and folding.

Protein Physics is aimed at a broad audience of undergraduate and graduate students, as well as being a reference for researchers in academia and industry.

For those with a physics, chemistry or materials science background, the book provides details of protein structure, folding, action and design.

For the biophysicists, biochemists, biologists and medical students it is an invaluable resource on the principles of protein physics and spontaneous self-organization. To ensure a complete understanding of the course by those with a biological background, the book includes simple short-cut material on thermodynamics, statistical physics, and quantum mechanics.

This course is based on lectures now read by Professor A.V.Finkelstein at Moscow State

University. Many of the lectures from this course have been read at international schools and conferences on protein physics. The book will appeal to those on a wide-range of courses, including advanced courses on biophysics, biochemistry and soft matter physics and undergraduate courses on chemical physics, chemistry, chemical biology and physics.

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About the Author

Alexei V. Finkelstein is the Head of the Laboratory of Protein Physics at the Institute of Protein Research, Russian Academy of Sciences. He is also a Full Professor in Biophysics at the Pushchino Department of the Lomonosov Moscow State University. He won the National Prize of Russia in Science in 1999 and is a Howard Hughes Medical Institute International Research Scholar. He is the author of about 150 papers on protein physics. Oleg B. Ptitsyn (deceased 1999) was the Head of Protein Physics Laboratory at the Institute of Protein Research, Russian Academy of Sciences and a Visiting Scientist at the Laboratory of Experimental and Computational Biology, Molecular Structure Section, National Cancer Institute, USA. He was also a member of the European Academy of Sciences and winner of the National Prize of Russia in Science (1999). He authored about 250 papers on polymer and protein physics. Their laboratory is one of the most distinguished in the world for its work in protein physics. It is one of the few laboratories outside the USA to receive support from the Howard Hughes Medical Institute. Both scientists have very high international reputations, Professor Finkelstein is frequently invited to conferences in Europe and in the USA, as was Professor Ptitsyn before his recent death.

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