SPECIAL TOPICS

Physics of Soft Condensed Matter

Preface

These days, the term "soft matter" indicates a unified subject that includes aspects of polymers, liquid crystals, colloids, amphiphiles, glasses, granular materials, and biological materials. Historically speaking, many of these materials had been investigated over the past century somewhat independently of each other as important disciplines of physical chemistry. After the critical phenomena of second-order phase transitions were almost completely understood in the 1970s, some physicists started to pay attention to the "nasty" systems mentioned above using ideas such as "universality" or "scaling". One of the leaders in this field was Professor P.-G. de Gennes who unfortunately passed away in 2007. Such a new approach in physics has been proved to be quite successful and Professor P.-G. de Gennes was awarded the Nobel Prize in Physics in 1991. His Nobel Lecture was entitled "Soft Matter".

Owing to the rapid expansion and growth of this research area in the last few decades, it is now generally recognized that soft matter physics constitutes one of the important areas of condensed matter physics. For example, the textbook entitled "Principles of Condensed Matter Physics" written by Professor P. M. Chaikin and Professor T. C. Lubensky (Cambridge University Press, 1995) provides us with new concepts of condensed matter physics in which soft matter physics is incorporated in a unified manner. Moreover, the study of soft matter has stimulated fruitful interactions among physicists, chemists, and engineers, and is now reaching out to biologists. A broad interdisciplinary community has emerged over the last 15 years.

It should be strongly emphasized and recalled that there have been many important contributions to soft matter physics by Japanese scientists. In fact, many outstanding studies both experimentally and theoretically have enriched the fields of polymers, colloids, liquid crystals and other materials. Therefore, it is quite significant to present a special issue of the Journal of the Physical Society of Japan (JPSJ) on the topic of "Physics of Soft Condensed Matter".

The present special issue includes 11 articles written by relatively young scientists working on soft matter physics. Among these articles, 5 are contributed by foreign authors. We hope that this special issue will interest not only scientists in related fields but also the broad readers of JPSJ. Finally, we would like to thank all the corresponding authors who prepared their excellent contributions within a very short period.

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