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# *Book Review*

**Recent Advances in the Quantum Theory of Polymers (Lecture Notes in Physics, Vol. 113).** Berlin–Heidelberg–New York: Springer-Verlag 1980. V + 306 pp., 100 figs., 35 tab., soft cover, price: DM 37.60, US $22.20

This volume represents the Proceedings of a Symposium held at Namur, Belgium, in 1979. It continues the NATO-sponsored Symposia held before in Belgium. The text is divided into four parts which cover a short experimental survey of the area, theoretical approaches to ordered systems, a short text on theoretical approaches for disordered systems, and then a summing-up paper. Although the Symposium and volume are primarily devoted to theoretical considerations, nevertheless it is crucial that the theoretician attempts to relate his results to those of real physics. Hence, the inclusion of a section, albeit rather short, on the experimental side, is most welcome in this volume. The theoretical approaches cover those which are mostly being used today, i.e. localized orbital techniques, the Hartree–Fock method, multiple expansion techniques, and density functional formulism. A number of subjects which are subsidiary to these main headings are then covered, e.g. the calculation of transport properties, of vibrational spectra and magnetic properties. On the whole, the theoretical approach for ordered systems, which is by far the largest section, is a highly authoritative account of the techniques used in the more advanced calculations of today. What is singularly lacking in this area is an account of the use, strength, and weaknesses of the more semi-empirical approaches to the calculation of the electronic structures. There is no doubt that, at present *ab initio* techniques, although extremely useful, cannot deal with the complicated problem of solids which have large unit cells and /or low symmetry. Hence, an account of work in this area would have been a considerable advantage in the context of this book.

The short section on disordered sections is most welcome, as so many books only consider the problem for the fully ordered crystal. Disordered systems have their own acute problems and, indeed, it might have been an improvement on the workshop if more work on these technologically important systems had been included.

The whole volume ends with an admirable summing up of the present state of the art and what one may be able to expect in future. Overall, this book is a 'must' for the shelf of any theoretician working in the solid state and, particularly, in the polymer field.

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