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Book Review: Moment Methods in Many-Fermion Systems

Theory and Applications of Moment Methods in Many-Fermion Systems, *Edited by B. J. Dalton, S. M. Grimes, J. P. Vary, and S. A. Williams,* Plenum Press, New York, 1980.

This book contains the proceedings of a conference on the application of the moment problem which was held at Ames, Iowa, September 10–13, 1979. It is, generally speaking, a well-printed book consisting of photo-offset reproductions of typed contributions. I noted some exceptions such as the illiterate running head provided by the publisher for the De Facio *et al.* article.

Generally speaking, the articles group themselves into four classes. I will mention the authors of some representative members of each class for conciseness and not to exclude the authors of other equally good papers which are reported.

First of all, there are articles on the general method of moments such as the ones by French.

Secondly, there are articles on how to actually calculate these moments. Current progress in recent years has been made on this computational endeavor, which is what makes the moment method particularly useful and interesting now. The articles by Ginnochio, Bloom and Hausman, and Vary are representative of these techniques.

Thirdly, there are articles on what to do with the moments once you obtain them. Articles by Langhoff, Whitehead, and Bessis are representative here. Of particular interest to this reviewer is the fact that all of these methods seem to be mathematically quite closely related to various Padé approximant techniques.

Finally, there are articles on the problems from which these moment problems arise. Mainly in this book nuclear physics examples are described, although some mention is made of other topics. De Facio *et al.* discuss application to the Ising model. A quotation from this book of interest in the

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area of statistical physics is the one by Whitehead on page 254:

> While it is to be fervently hoped that nuclear physics does not follow field theory by turning into a branch of solid-state physics, we ought to be looking hard at these techniques to see whether they can be pressed into service in the solution of our problems.

This quotation does indicate the growth and the usefulness of the methods that researchers in statistical physics have been developing through the years.

All in all, I would recommend this book for anyone who wishes to have a good understanding of the current state of the moment method.

George A. Baker, Jr.
Theoretical Division
Los Alamos Scientific Laboratory
Los Alamos, New Mexico 87545