more purely theoretical lines are not considered in any detail. This approach will appeal particularly to experimentalists.

Some important topics, such as the time-dependent Hartree–Fock approach to deep-inelastic collisions, are mentioned only briefly, but these can be addressed through the very extensive reference lists included with each chapter. An appendix contains a list of relevant and generally available conference proceedings. Omitted altogether from the book are discussions of relativistic reactions, the role of heavy ions in atomic, surface and applied physics, nuclear spectroscopy with heavy ions, and instrumentation.

Bass has achieved his goal of providing an introductory, critical survey of heavy-ion nuclear reactions at energies below 10 MeV per nucleon. The book could be used very advantageously to enrich an advanced graduate course, and, supplemented by the current literature, it should be uniquely valuable to anyone embarking on heavy-ion research.

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Molecular Hydrodynamics

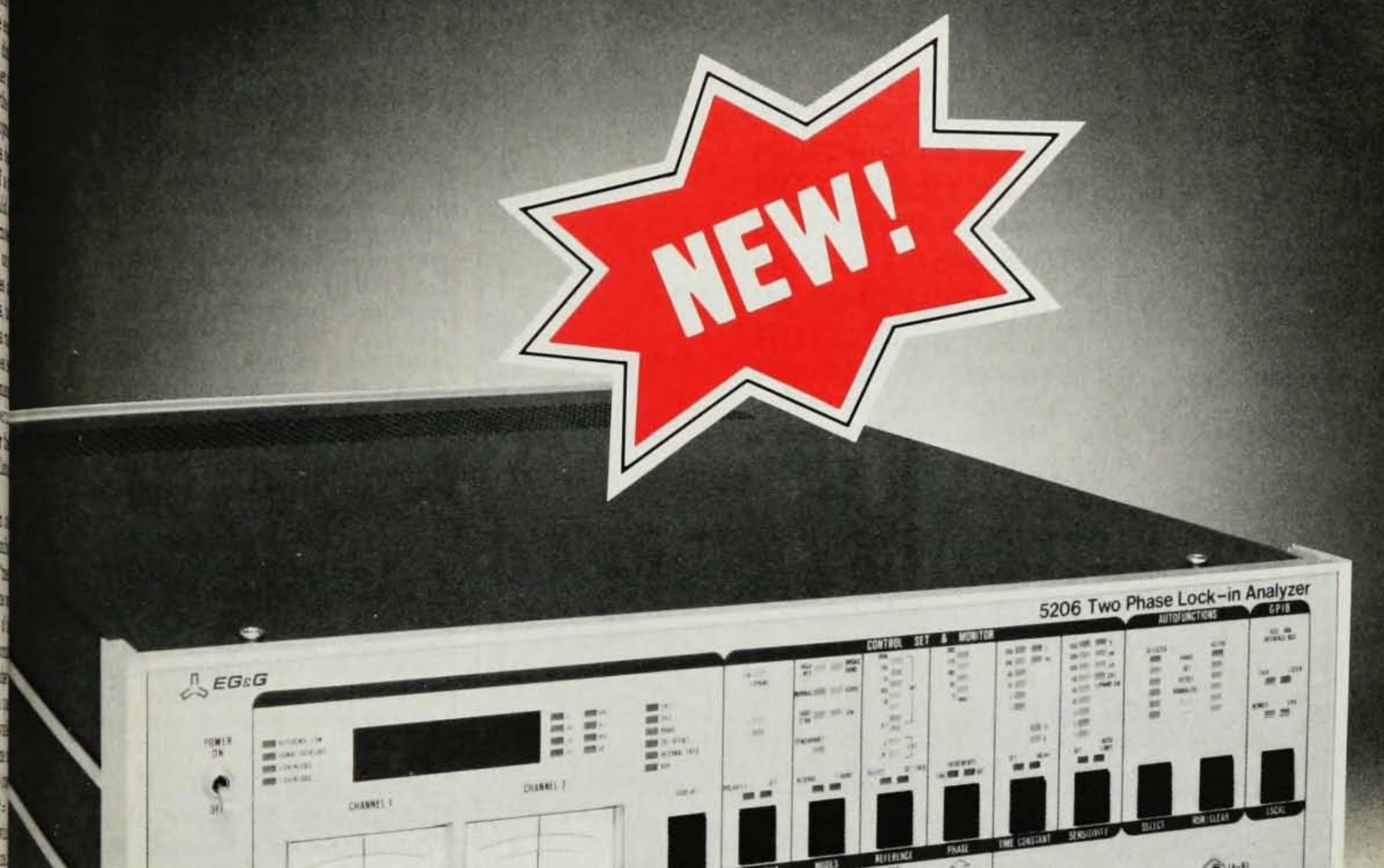
J. P. Boon, S. Yip
417 pp. McGraw-Hill, New York, 1981. $49.95

The microscopic structure of fluids has been one of the most persistently active fields in theoretical physics in recent decades. A series of surges in the literature has occurred as each subfield has expanded, matured and become routine. The study of the basic equilibrium properties of uniform simple fluids completed its cycle in the 60s, producing progeny that are now flourishing. Almost certainly, the most important of these concerns time correlations in uniform fluids: the theoretical underpinning of the general theory of linear transport. Despite the voluminous literature accumulated, there has existed until now no treatment of sufficient depth and breadth to do justice to the topic. To provide such a treatment is the intent of the monograph under review, a collaboration by two accomplished professionals.

On a technical level, the overall problem treated is that of determining the time correlations between microscopic observables in a uniform classical fluid in thermal equilibrium. For example, one might ask for the time development of the velocity distribution of a particle whose initial velocity is known. This situation is typical in that the input information is insufficient to fix the subsequent many-particle dynamics. Instead, one has an initial thermal distribution conditioned upon knowledge of the mean values of a set of characteristic observables; starting from these, one can then—in principle—follow the ensuing time development of the full distribution function, but this is neither necessary nor sufficient to describe the physics. Rather it is the time development of the same mean values that is desired, for it offers the possibility of a closed dynamics, microscopically valid, of local properties of the fluid—a molecular hydrodynamics. Thus, not only can one envision a first-principles derivation of linear hydrodynamics, but one can also ask questions about a range of wave numbers and frequencies beyond the usual scope of hydrodynamics, a range requiring such experimental tools as neutron scattering or theoretical tools as computer simulation for assessment of the answers.

Several threads are woven into the text to provide a natural unification. First is the concept of a "memory" function. The dynamics of the correlations, or equivalently, those of the response, say $R(t)$, to an initial constraint, depend not only upon the observable being followed at the time in question, but also upon all of the invisible degrees of freedom. Hence, one cannot write $dR/dt = KR$ for some (operator) K, but rather $dR(t)/dt = \int K(t') \times R(t - t')dt'$. Then $K(t')$, which decreases as one goes back in time, is the memory function. A second, associated, thread is the projection technique, which formalizes the averaging over the invisible degrees of freedom. A third is the choice of a particular set of observables to concentrate on, here, the one-body phase-space distribution, in terms of which the primitive local variables of the fluid can be expressed. A fourth is the use of exact relations—sum rules—to direct interpolation between solved special cases. A final thread is the extensive reference to computer simulation both to assess the detailed validity of approximations that are made, and indeed to motivate them.

Considering the scope of the material in this book, it is quite well organized. A short introductory chapter is followed by an extensive, yet succinct, review of the concepts, basic tools, and basic approximations of the subject. In-depth analysis starts with self-diffusion as represented by the velocity autocorrelation function and continues with a discussion of anomalous long-time dependence. Extension to the full time-dependent self-distribution follows, with versions for several different models. The stage is then set for a return to the principal topic of time-dependent density–density correlations, and its relation to linear transport. The latter is used to predict and interpret the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long-wavelength low-frequency aspects of the former, with particular attention to experimental results. In a long concluding chapter, the hydrodynamic viewpoint is extended to the high-frequency short-wavelength microscopic domain via a nicely graded conceptual and analytic sequence.

From a larger point of view, the literature coverage in this text is impressive. Although some minor rivulets are omitted, the main streams of current research are explored in depth. The reader is led by the hand, important concepts being repeated as necessary. There are some overly glib statements and derivations, but not many. In a work of this type, the authors must decide upon what sort of critical attitude to adopt, and the one chosen here is scrupulous impartiality. This even-handedness results in a somewhat grey tone, with few bright highlights. The net effect is that the work is not to be read as a novel, but is rather to be studied in segments, or referred to as an in-depth entree to the literature. I will value it as such.

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Galileo and the Art of Reasoning: Rhetorical Foundations of Logic and Scientific Method

M. A. Finocchiaro
498 pp. Reidel, Dordrecht, Holland, 1980.
$42.00 cloth, $21.00 paper

This book is not recommended for those who wish to find out about the content, history or success of Galileo's famous *Dialogue Concerning Two Chief World Systems*. While the book does deal almost exclusively with this famous work, the author's intention is to explain Galileo's rhetorical style, which he does by summarizing the *Dialogue's* structure and then by drawing many long conclusions from this simple summary. The conclusions, which form the bulk of this lengthy work, dispute the claims of other authors who have written about Galileo.

Though Finocchiaro exhibits much erudition in the scope of his references and demonstrates novel relationships of other work to Galileo's (for example, Croce and Ortega), it is not clear exactly what emerges from the 450 pages of his book. Certainly the general thrust is right. Galileo did develop, consciously, a style of writing that was rhetorically effective. It is equally true that Galileo is remembered in literature classes in Italy as a stylist (most for his work *Il Sagiatore* though, not for the *Dialogue*), as well as in history of science and philosophy courses. What is probably not true is that Galileo shared