*Int. J. Heat Mass Transfer.* Vol. 18, p. 346. Pergamon Press 1975. Printed in Great Britain

# BOOK REVIEW

G. C. POMRANING, **The Equations of Radiation Hydrodynamics.** Pergamon Press, Oxford (1973). £7, 288 p.

THIS book deals with the transport of thermal radiation through fluids and the effect of the radiative transport on the equations governing the fluid motion. The book, which is written in a straight-forward style, presents in a clear manner a general approach to the equations of transport theory and hydrodynamics. The first two chapters treat the basic concepts of transport theory and the equation of transfer; the transfer equation is derived by two different approaches and presented in various forms. These chapters also discuss induced processes and the concept of LTE as well as presenting a discussion of the validity of the transfer equation. The third chapter deals with angular (e.g. Eddington approximation) and frequency (special cases are the Planck and Rosseland means) approximations for simplifying the transfer equation. Chapters 4 and 5 give a rather interesting presentation of including polarization effects as well as refractive and dispersive effects in the description of radiative transport. Chapter 6 deals with the effect of a preferred fluid motion on the equation of transfer. Chapter 7 gives a very brief discussion of the formulation of absorption and scattering coefficients. Compton scattering (and inverse Compton scattering), is discussed in Chapter 8. Finally, the equations of relativistic hydrodynamics including the effects of a radiation field are presented in Chapter 9. The equations are presented from both the Eulerian and Lagrangian viewpoint as well as what the author calls a modified Eulerian approach. This very brief presentation of the contents, which obviously could be obtained from reading the contents listing, is for the sake of the reader that does not have access to book and serves as support for some of the statements in this review.

As stated on the book jacket, the book hopefully serves as a vehicle for pointing out the similarities between various fields dealing with thermal radiative transport. The fields that are listed on the jacket are astrophysics, plasma physics, high-temperature gas dynamics, neutron transport theory, nuclear weapons effects, rarefied gas dynamics and radiative heat transfer. The attempt to bridge the gap between these fields is a noble effort, however, I feel that this book does not accomplish this feat, at least from the standpoint of an engineer working in the field of radiative transport. This, however, is not to say that the book is a complete waste of time for the engineer to read. The engineering researcher working on the forefront of radiative transport theory will find the book interesting and informative from a very general viewpoint; the derivations are generally very clear and material that is very difficult to sort out from numerous literature sources is presented in a concise form. I, however, cannot recommend this book for the heat transfer research community. The engineering researcher trying to solve problems such as heat transfer in furnaces, in unwanted fire situations, in combustors, etc., would find very little usable information in this book. The usefulness to the other fields can only be determined by people working in those fields.

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