The two-body, short-range potential model is the most realistic model of strong interactions that at the same time is mathematically well defined. Questions asked here have definite answers, a situation not always true for relativistic models, and the book by Alfaro and Regge presents the definitive answers available to them at the time of publication. The emphasis throughout is on the scattering (S) matrix, the concept through which it is hoped that a link with relativisitic theory eventually will be established. Exhaustively discussed are the analytic structure and asymptotic behavior of the S-matrix generated by a potential, those aspects with a chance of relativistic application being underlined.

Analytic properties in the complex angular-momentum plane naturally play a key role, Regge's original work having centered on analytic interpolation in angular momentum. To the best of the reviewer's knowledge, the only significant published results not covered by Alfaro and Regge are those pertaining to the left half of the angular-momentum complex plane. Recent developments in relativistic theory and experiment indicate that this region, largely ignored by Alfaro and Regge, is of substantial interest.

For a physics book there is a high level of mathematical precision, and the reading cannot be described as easy. By the same token, however, this monograph will represent for some time to come the standard reference on nonrelativistic potential scattering.

• • •

Professor Chew, who is a member of the Berkeley faculty, is well known for his "bootstrap" theory of particle dynamics.

Classical optics and extensions to current research

OPTICAL PHYSICS. By Max Garbuny. 466 pp. Academic Press, New York, 1965. $14.50.

by Joseph G. Hoffman

The preface says this work was intended as a textbook. It is an exceptionally good one, even though it has no problem sets at the end of each chapter or in an appendix. It is a highly readable account of recent basic work in optics. The author has extensive practical experience and is experimentally oriented. He gives the material in terms of the barest essential mathematics, with emphasis on facts and concepts which are developed with a superb clarity. The point of view will appeal to all students.

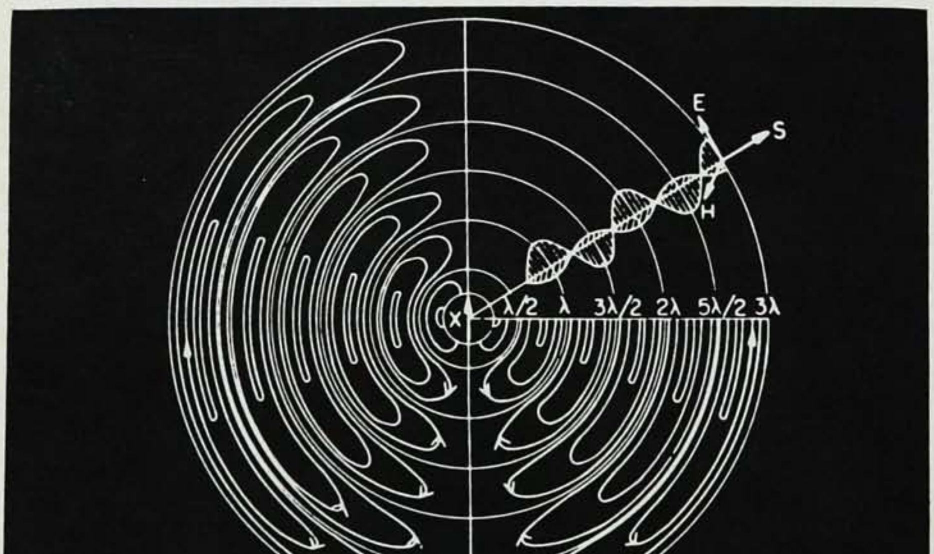
Chapter 2 deals with emission and absorption of heat radiation in a unique sequence. Following a discussion of black-body theory and quantum statistics, among other pertinent topics, there is a section on actual sources of heat radiation continua which leads into an exposition of thermal plasmas. Chapter 3, on monochromatic radiation, develops radiation theory to the matrix element of the dipole moment, and then to quadrupole transitions, a subject further elaborated in chapter 4 with a section on multipole radiation and its transition rules. Standard phenomena of propagation, such as reflection, refraction, and polarization, are supplemented with interesting descriptions of liquid crystal properties in chapter 5. Chapter 6, on interactions of coherent radiation with matter, includes the theory of photon correlation and the Hanbury Brown–Twiss experiment, and a thorough summary of maser phenomena in theory and experiment.

Chapter 7 is entitled "Secondary effect of light and processes of detection," and illustrates the applications of theoretical concepts to practical means for detection of light. An example of the author's range is his discussion of the vectorial photoelectric effect discovered in 1894 by Elster and Geitel and not yet satisfactorily explained.

The format is inviting; the author and subject indices adequate; and the generous references given after each of the seven chapters support the rapidly moving text. This is a highly commendable presentation of classical physical optics and its extensions into current optics research.

* * *

Joseph G. Hoffman is professor of physics at the State University of New York at Buffalo.



HERTZIAN PATTERN of spreading electromagnetic waves generated by an oscillating dipole. Contours shown are instantaneous configurations of the electric field in the near- and far-zone. Complete spatial pattern is obtained as a figure of revolution around the dipole axis. Shaded curves are phase variation of electric and magnetic field in direction of Poynting vector. From *Optical Physics*.