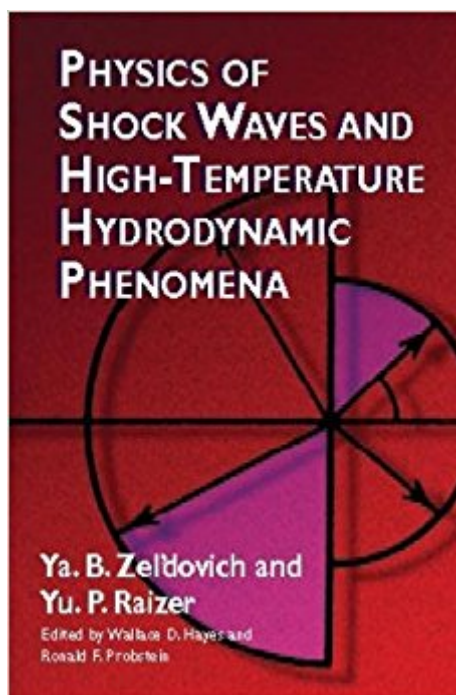




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Physics Of Shock Waves And High-Temperature Hydrodynamic Phenomena (Dover Books On Physics)



Synopsis

High temperatures elicit a variety of reactions in gases, including increased molecular vibrations, dissociation, chemical reactions, ionization, and radiation of light. In addition to affecting the motion of the gas, these processes can lead to changes of composition and electrical properties, as well as optical phenomena. These and other processes of extreme conditions — such as occur in explosions, in supersonic flight, in very strong electrical discharges, and in other cases — are the focus of this outstanding text by two leading physicists of the former Soviet Union. The authors deal thoroughly with all the essential physical influences on the dynamics and thermodynamics of continuous media, weaving together material from such disciplines as gas dynamics, shock-wave theory, thermodynamics and statistical physics, molecular physics, spectroscopy, radiation theory, astrophysics, solid-state physics, and other fields. This volume, uniquely comprehensive in the field of high-temperature gas physics and gas dynamics, was edited and annotated by Wallace D. Hayes and Ronald F. Probstein, leading authorities on the flow of gases at very high speeds. It is exceptionally well suited to the needs of graduate students in physics, as well as professors, engineers, and researchers.

Book Information

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Son of a Gambling Man

Ronald F. Probst, Ford Professor of Engineering, Emeritus, at the Massachusetts Institute of Technology has had a long career in engineering research and has made significant contributions in many areas from ballistic missile design, to hypersonic flight theory, to the field of synthetic fuels, a subject of obvious importance to everyone. His 1959 book, *Hypersonic Flow Theory*, co-authored with Wallace D. Hayes, and reprinted by Dover in 2004 as *Hypersonic Inviscid Flow*, is still the basic book on this subject. *Synthetic Fuels*, written with R. Edwin Hicks, is certainly one of the most important and timely engineering texts ever reprinted by Dover. In addition to their own writings, Probst and Hayes edited the English translation of a major text by two distinguished Russian physicists, Ya. B. Zel'dovich and Yu. P. Raizer, *Physics of Shock Waves and High-Temperature Hydrodynamic Phenomena*. — However, Dr. Probst's literary legacy isn't all about hard science. In 2009 he published an evocatively entertaining memoir of his father and their life in Depression-era New York, *Honest Sid: Memoir of a Gambling Man*. Even though not a Dover book, it is certainly highly recommended.

Critical Acclaim for *Physics of Shock Waves and High-Temperature Hydrodynamic Phenomena*: "The republication by Dover Publications of this masterwork by Ya. B. Zel'dovich and Yu. P. Raizer will be welcomed by all workers dealing with high-temperature (radiating) flows. This book is a virtual 'bible' for studies of shocks and radiation fronts in high speed aeronautics, astronautics (re-entry), astrophysics, fireballs, shock tubes, and very intense explosions. Zel'dovich was a physicist of extraordinary breadth of interests. The style of this book is to give heuristic explanations followed by rigorous analysis. It is insightful for both beginning students and researchers in the field. This book is an **ABSOLUTE MUST** for anyone working on the subjects listed above." "I URGE anyone working in astrophysics and high-temperature flow physics to buy, read, enjoy, and be enlightened by this masterpiece." — • Dimitri Mihalas, co-author of *Foundations of Radiation Hydrodynamics*

The fields of shock waves and high temperature hydrodynamics have been exhaustively examined in the literature and, while more recent treatments exist, there is still no better introduction than this enduring classic. The mathematically correct presentation of most of the relevant physics quickly enables applied mathematicians and engineers working in these disciplines to achieve the level of understanding necessary to start producing useful results. It can be read in its entirety as a solid introduction to more specialised topics or simply serve as an excellent reference. And the price of this beautifully reprinted volume from Dover is irresistible.

You only have to read a couple of chapters from this book if you are a beginner in shock wave

science to gain a basic understanding. This is an excellent book together with Courant's book *Supersonic Flow and Shock Waves* (Applied Mathematical Sciences) (v. 21)

GREAT

The author is the "father" of high temperature, high pressure physics. While not discussed directly, clearly this book is a data dump of the knowledge in the USSR developed during their nuclear weapons programs..... many of the physicist that developed the Soviet nuclear capabilities were Jewish and this book should be a tribute to their contribution (in particular in light of Stalin's purge of the Jews from all high positions).

This book is a true classic, written by the great Zel'dovicha long time ago. Dover's two-volumes-in-one book new edition provides an excellent opportunity to enrich every physics library, private or institutional.

Happy with purchase.

I've wasted many credit hours taking physics courses all the way up through grad school and never learned a damned thing! This book reignited my interest in physics. It explains how to think about the physics and what things mean as opposed to the typical nonsense of here's the equation and the solution (solution obtained by some absurd change of variable or transformation that you will never be able to guess if you lived a 1.0×10^{12} years!) Gives great insight on physical modeling. This is one of few physics books I cannot live without. This is one of 3 books that allowed me to get a Ph.D! However, it is not for beginners. You must have some experience in fluid mechanics and quantum mechanics in order to appreciate the material. The book is not going to tell you how to solve problems, but focus on the meaning of results.

The republication by Dover Publications of this masterwork by Ya. B. Zel'dovich and Yu. P. Raizer will be welcomed by all workers dealing with high-temperature (radiating) flows. This book is a virtual "Bible" for studies of shocks and radiation fronts in high speed aeronautics, astronautics (re-entry), astrophysics, fireballs, shock tubes, and very intense explosions. Zel'dovich was a physicist of extraordinary breadth of interests. The style of this book is to give heuristic explanations followed by rigorous analysis. It is insightful for both beginning students and researchers in the field.

This book is an ABSOLUTE MUST for anyone working on the subjects listed above. The Dover edition binds both original volumes as one, and is based on the very scarce second printing, in which most of the typographical errors in the first printing were corrected. All other errors noted over the years since the original edition went out of print have been collected and corrected in this version, which should be virtually error free. I URGE anyone working in astrophysics and high-temperature flow physics to buy, read, enjoy, and be enlightened by this masterpiece.

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