



Physics of the Interstellar and Intergalactic Medium (Princeton Series in Astrophysics)

By Bruce T. Draine

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This is a comprehensive and richly illustrated textbook on the astrophysics of the interstellar and intergalactic medium--the gas and dust, as well as the electromagnetic radiation, cosmic rays, and magnetic and gravitational fields, present between the stars in a galaxy and also between galaxies themselves.

Topics include radiative processes across the electromagnetic spectrum; radiative transfer; ionization; heating and cooling; astrochemistry; interstellar dust; fluid dynamics, including ionization fronts and shock waves; cosmic rays; distribution and evolution of the interstellar medium; and star formation. While it is assumed that the reader has a background in undergraduate-level physics, including some prior exposure to atomic and molecular physics, statistical mechanics, and electromagnetism, the first six chapters of the book include a review of the basic physics that is used in later chapters. This graduate-level textbook includes references for further reading, and serves as an invaluable resource for working astrophysicists.

- Essential textbook on the physics of the interstellar and intergalactic medium
- Based on a course taught by the author for more than twenty years at Princeton University
- Covers radiative processes, fluid dynamics, cosmic rays, astrochemistry, interstellar dust, and more
- Discusses the physical state and distribution of the ionized, atomic, and molecular phases of the interstellar medium
- Reviews diagnostics using emission and absorption lines
- Features color illustrations and detailed reference materials in appendices
- Instructor's manual with problems and solutions (available only to teachers)

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Physics of the Interstellar and Intergalactic Medium (Princeton Series in Astrophysics) By Bruce T. Draine Bibliography

- Sales Rank: #899157 in Books
- Published on: 2011-01-09
- Original language: English
- Number of items: 1
- Dimensions: 9.10" h x 1.30" w x 6.10" l, 2.05 pounds
- Binding: Paperback
- 560 pages

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Editorial Review

Review

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From the Back Cover

"This is the book that I have been waiting for for twenty years. With exceptional clarity, Draine introduces the underlying physics and brings the basic pieces together to describe the multiphase structure of the interstellar and intergalactic medium. Combined with many useful tables and figures, this book will rapidly become a hit with students and researchers alike. It continues the fine tradition of Princeton professors writing seminal books on this topic."--**Ewine van Dishoeck, Leiden University**

"A true tour de force, providing a definitive account of the physics of interstellar matter. Written with authority and insight by a master of the subject, Bruce Draine's book will be a treasured guide for new graduate students as well as a comprehensive and rigorous reference for galactic and extragalactic researchers."--**Eve Ostriker, University of Maryland**

"Draine has written an interstellar-medium textbook worthy of Lyman Spitzer, updated thirty years later. His coverage of atomic, molecular, radiative, thermal, and dynamical processes is excellent. Most valuable to students and professionals are the combinations of physical processes with multiwavelength observations appropriate for the modern astronomer."--**J. Michael Shull, University of Colorado at Boulder**

"This book is a comprehensive account of the physical processes that take place in the interstellar medium and that determine its behavior. It is likely to become the bible on the subject."--**Alexander Dalgarno, Harvard University**

"This is an outstanding text on an important topic in astrophysics. Draine carefully goes into the physical processes, providing a unifying discussion that is often missing in other treatments."--**Christopher F. McKee, University of California, Berkeley**

About the Author

Bruce T. Draine is professor of astrophysical sciences at Princeton University and a member of the National Academy of Sciences.

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