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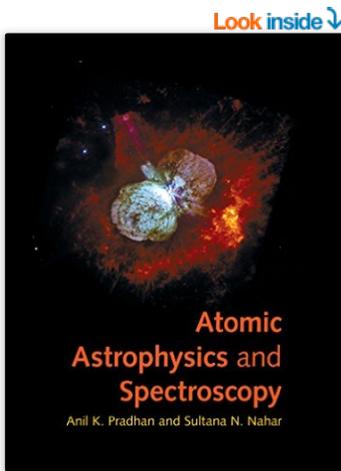
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by Anil K. Pradhan (Author), Sultana N. Nahar (Author)

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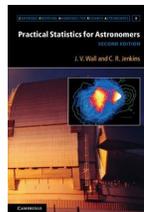
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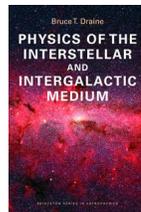
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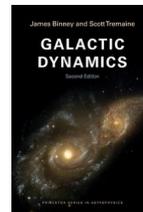
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Review

"This is a very important book that bridges the gap between modern atomic physics and modern astrophysics. It covers all the essential subjects, and is very well written. I think it will be of considerable value to research workers in both broad areas, to professors who wish to teach about the subjects, and to students. I expect that it will be very well received by both communities. I have learned a great deal from reading it myself. I'm happy that Cambridge will add this book to its distinguished series of books in physics and astrophysics." Dimitri Mihalas, G.C. McVittie Professor Emeritus, University of Illinois and Laboratory Fellow, Los Alamos National Laboratory

"Pradhan and Nahar have written the most coherent discussion of atomic processes that produce radiation in astrophysical thermal environments that I have read to date. Descriptions of the theoretical underpinnings of the processes are well balanced with the presentation of analytic relations that are necessary for the analysis of spectroscopic data. A great deal of ground is covered in the book and one of its strengths is that it provides the quantum mechanical basis for the processes while also giving the practical applications that are needed to interpret spectral features in astronomical objects. I highly recommend the book to spectroscopists as a fundamental resource." Dr Robert Williams, Space Telescope Science Institute and President of the IAU

"The discipline of Atomic Physics lies at the heart of Astrophysics. Most of what we know about the Universe is brought to us by radiation in the form of photons and it is the study of the spectra of the radiation that is our main source for understanding the nature of the Universe. The photons are modified on their journey to us by absorption, emission and scattering by atomic processes which provide a powerful diagnostic probe of the space through which they travel. The essential data that are observed are the spectral lines of the elements in their various ionization stages which the lines identify. The line strengths enable the element abundances to be determined and the physical characteristics of temperature, density and magnetic field and radiation intensity to be derived. By studying the atomic processes that control the physics of astrophysical plasma models of the spectra, the origins of the radiation can be modeled and the formation and evolution of galaxies, stars and planets and their interactions in the interstellar and intergalactic medium can be described. For the data analysis to be effective a secure extensive basis of understanding the extensive range of atomic processes that occur must be secured. Providing it is a major challenge. Atomic Astrophysics

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A multi-dimensional approach

By [Revanchist](#) on October 6, 2012

Format: Hardcover 2 of 2 people found this review helpful

Students and researchers in Astrophysics are undoubtedly aware of the great works in radiative transfer and processes (Rybicki & Lightman), stellar atmospheres (Mihalas) and several others on spectroscopy and atomic physics. Nonetheless, there is a real need for a book that combines these areas and gives a concise presentation of atomic physics in the context of astrophysics which are very important in understanding stellar atmospheres, gaseous nebulae, AGNs, etc. In addition, some of the works mentioned earlier haven't been updated and, though they are classics, some of the content has become somewhat dated.

This book, by Sultana & Nahar, is a welcome addition to the body of literature. It covers the physics of atomic processes and spectroscopy in detail. The discussion of electron-ion collisions and recombination, photoionization and radiative transitions was particularly noteworthy, since a good range of subtopics were covered without sacrificing lucidity in a concise manner. Also welcome are the applications of these processes to several astrophysical areas ranging from stellar atmospheres to cosmology. The book also has the advantage that it incorporates the latest research being done in these areas.

This is not quite the perfect book though. Since the book is roughly 300 pages long, some of its chapters are rather brief and cursory. I would have preferred it if the book had been a little longer, and covered topics such as absorption lines, radiative transfer and opacity in greater detail. Nonetheless, all things considered, this is a valuable book that is likely to appeal to a wide range of people.

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Atomic Astrophysics and Spectroscopy

By [osuphysicsstudent](#) on August 27, 2012Format: Hardcover **Verified Purchase** 2 of 2 people found this review helpful

As a student I found this book very accessible without compromising detail. It clearly describes atomic theory and how it governs spectroscopic results. The figures included are very helpful in enhancing the reader's understanding. I would highly recommend this book to anyone studying astronomy as it outlines how atomic processes interlink with our understanding of astronomy. I particularly liked this book because it not only talked about theory, but gave an introduction to research methods and applications of the theory. Good read.

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Comprehensive!

By [Berkeley Physics](#) on November 16, 2013Format: Hardcover **Verified Purchase** 2 of 2 people found this review helpful

Goes into amazing detail about all of the physical processes that are relevant to my research, including collisional ionization, recombination, and excitation, photoionization and radiative recombination, various forms of excitation, as well as important effects, like autoionization, that are not considered in standard derivations and missing from tabulated results.

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A good foundation....

By [Jen B](#) on July 19, 2013Format: Hardcover **Verified Purchase** 1 of 2 people found this review helpful

but not as good as Osterbrock and Ferland. It may be more comprehensive in scope but the writing is not as eloquent. A good introduction to the field.

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