Geophysics and Astrophysics Monographs

# Radiation Transport in Spectral Lines

**Grant Athay** 

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**Introduction to Advanced Astrophysics** V. Kourganoff, 2012-12-06 The purpose of this textbook is to provide a basic knowledge of the main parts of modern astrophysics for all those starting their studies in this field at the undergraduate level The reader is supposed to have only a high school training in physics and mathematics. In many respects this Introduction to Advanced Astrophysics could represent a volume of the Berkeley Physics Course Thus the primary audience for this work is composed of students in astronomy physics mathematics physical chemistry and engineering It also includes high school teachers of physics and mathematics Many amateur astronomers will fmd it quite accessible In the frame of approximations proper to an introductory textbook the treatment is quite rigorous Therefore it is also expected to provide a firm background for a study of advanced astrophysics on a postgraduate level A rather severe selection is made here among various aspects of the Universe accessible to modern astronomy This allows us to go beyond simple information on astronomical phenomena to be found in popular books and to insist upon explanations based on modern general physical theories More precisely our selection of topics is determined by the following considerations The study of the solar system the Moon and the planets has recently progressed at a tremendous rate However the very rich harvest of observations provided by space research is mainly purely descriptive and is perfectly presented in review papers of Scientific American Science Physics Today and similar **Ionospheric Techniques and Phenomena** A. Giraud, M. Petit, 2012-12-06 If our eyes were radio rather than magazines optical wide band detectors it is well known that for us the brightest object in the sky would still be the Sun that planets stars and the Milky Way would still shine feebly and that we would still occasionally be blinded by man made sources What is less well known is that quite a different earthbound overcast would hover about us with its climatic zones its seasonal changes its unpredictable storms and scintillating transparence To be sure we can get a sort of glimpse of this peculiar type of weather when we tune our receiver to radio broad casting from some remote spot or photograph the Earth from space at certain specific wavelengths Nevertheless no one has ever looked at the ionized shroud of the Earth without the help of sophisticated apparatus and this is one of the reasons why in this domain the phenomena are not easily abstracted from the use of specific techniques For generations the study of the ionosphere has been deeply interwoven with the practice of radio communication and detection Today however ionospheric physics is best thought of as a branch of space physics that part of physics which deals with processes at work in the solar system and methods developed for its exploration Catalog of the United States Geological Survey Library U.S. Geological Survey Library, 1974 Turbulent Diffusion in the Environment G.T. Csanady, 2012-12-06 The rather excessive public preoccupation of the immediate past with what has been labeled the environmental crisis is now fortunately being replaced by a more sus tained and rational concern with pollution problems by

public administrators engineers and scientists It is to be expected that members of the engineering profes sion will in the future widely be called upon to design disposal systems for gaseous and liquid wastes which meet strict pollution control regulations and to advise on possible improvements to existing systems of this kind. The engineering decisions involved will have to be based on reasonably accurate quantitative predictions of the effects of pollutants introduced into the atmosphere ocean lakes and rivers A key input for such calculations comes from the theory of turbulent diffusion which enables the prediction of the concentrations in which pollutants may be found in the neighborhood of a release duct such as a chimney or a sewage outfall Indeed the role of diffusion theory in pollution prediction may be likened to the role of applied mechanics strength of materials in the design of structures for adequate strength At least a certain group of engineers will have to be proficient in applying this particular branch of science to practical problems At present training in the theory of turbulent diffusion is available only at the gra duate level and then only in a very few places Gamma-Ray Astronomy E.L. Chupp, 2012-12-06 Observation of discrete energy electromagnetic emissions from celestial objects in the radio IR optical IN and X ray spectral regions has dramatically advanced our know ledge in the field of astrophysics It is expected that identification of nuclear Y ray line emissions from any cosmic source would also prove to be a powerful new tool for probing the Universe Since the publication of Morrison's work in 1958 many experiments were carried out searching for evidence of Y ray lines from cosmic sources however with little success Only a few positive experimental results have been reported in spite of an expenditure of considerable effort by many people in particular the possible Galactic Center emission line 473 to 530keV and Y ray lines at several energies e g 0 5 MeV and 2 2 MeV associated with large solar flares Both of these observations are unconfirmed by indepen dent observations ca 1975 The high energy Y rays 30MeV from the Galactic Center are at least partly due to the decay of 1 0 mesons which are of unique energy 67 5 MeV in the 1 0 rest frame only The reasons for the limited amount of data avail able in this field even though early theoretical predictions were very optimistic regarding fluxes of nuclear lines are that experimental efforts are plagued with high backgrounds and low fluxes and that development of instruments with telescopic properties in the energy range of interest is difficult **Thermodynamics** J. V. Iribarne, W. L. Godson, 2013-03-09 The thermodynamics of the atmosphere is the subject of several chapters in most textbooks on dynamic meteorology but there is no work in English to give the subject a specific and more extensive treatment In writing the present textbook we have tried to fill this rather remarkable gap in the literature related to atmospheric sciences Our aim has been to provide students of meteorology with a book that can playa role similar to the textbooks on chemical thermodynamics for the chemists This implies a previous knowledge of general thermodynamics such as students acquire in general physics courses therefore although the basic principles are reviewed in the first four chapters they are only briefly discussed and emphasis is laid on those topics that will be useful in later chapters through their application to atmospheric problems No attempt has been made to introduce the thermodynamics of irreversible processes

on the other hand consideration of heterogeneous and open homogeneous systems permits a rigorous formulation of the thermodynamic functions of clouds exclusive of any consideration of microphysical effets and a better understanding of the approx imations usually implicit in practical applications The Moon in the Post-Apollo Era Zdenek Kopal, 2012-12-06 The aim of the present book will be to summarize the results of the space exploration of the Moon in the past fifteen years culminating in the manned Apollo missions of 1969 1972 on the background of our previous acquaintance with our satellite made in the past by astronomical observations at a distance Astronomy is one of the oldest branches of science conceived by the inquisitive human mind though until guite recently it had been debarred from the status of a genuine experimental science by the remoteness of the objects of its study With the sole exception of meteoritic matter which occasionally finds its way into our labora tories all celestial bodies could be investigated only at a distance namely from the effects of attraction exerted by their mass or from the ciphered messages of their light carried by nimble footed photons across the intervening gaps of space A dramatic emergence oflong range spacecraft capable of carrying men with their instruments not only outside the confines of our atmosphere but to the actual surface of our nearest celestial neighbour has since 1957 thoroughly changed this time honoured picture In particular as we shall detail in Chapter 1 of this book space astronomy of the Moon is barely 15 years old But relative infant as it is by age it has already provided us with such a tremendous amount of new and previously inacces sible scientific data as to virtually revolutionalize our subject Journal of Scientific & Industrial Research ,1974 The Light of the Night Sky F. Roach, 1973-12-01

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