



METADATA

Title: Space Physics

Other Titles: -

Language: Greek

Authors: Daglis, A. I., Professor, UOA, Katsavrias, C., Postdoctoral Researcher, UOA, Sergis, N., Chief Executive Officer, Hellenic Space Center, Georgiou, M., Postdoctoral Researcher, UOA

ISBN: 978-618-228-148-2

Subject: NATURAL SCIENCES AND AGRICULTURAL SCIENCES, ENGINEERING AND TECHNOLOGY

Keywords: Space Physics / Solar Physics / Space Weather / Space Technology / Sun

Bibliographic Reference: Daglis, I., Katsavrias, C., Sergis, N., & Georgiou, M. (2023). Space Physics [Undergraduate textbook]. Kallipos, Open Academic Editions. <http://dx.doi.org/10.57713/kallipos-384>

Abstract

This book covers the field of Space Physics, including some essential elements of Solar and Plasma Physics. Thus it complements the available academic books, as until recently there was no Space Physics book available in Greek. This book is divided into three parts. The first part is an introduction to Plasma Physics, dealing with basic plasma concepts such as frequency, gyroradius and electromagnetic shielding, while a detailed description of the motion of charged particles in electromagnetic fields, the kinetic theory and the magnetohydrodynamic approximation of plasma as a set of charged particles follow, as well as the waves generated in plasma and especially the waves generated in a planetary magnetosphere. The second part is the main part of Space Physics. Beginning with a description of the Sun and the solar wind as drivers of geospace disturbances, it continues with a detailed description of geospace as a

set of trapped charged particle populations interacting with magnetic fields and various current systems within the Earth's magnetosphere, while also detailing the conditions that lead to disturbances of the system causing its extremely high variability. This section concludes with a description of the magnetospheres of the two largest planets in our solar system, Jupiter and Saturn. The third part is an introduction to Space Weather and space technology. It begins by describing basic techniques for measuring particles and electromagnetic fields in space, characteristics of space systems, and the basic principles of rocket launch. Finally, the reader has a first acquaintance with the applied part of Space Physics, i.e. space weather and its effects both on terrestrial and space technological infrastructures and on humans themselves, highlighting the need for timely and accurate predictions of geospace dynamics.