PHYSICS OF THE SOLAR CORONA AND TRANSITION REGION

Part II

Proceedings of the Monterey Workshop, held in Monterey, California, August 1999

Edited by

ODDBJORN ENGVOLD

Institute of Theoretical Astrophysics, Oslo

and

JOHN W. HARVEY

National Solar Observatory, Tucson

In collaboration with

CAROLUS J. SCHRIJVER and NEAL E. HURLBURT

Lockheed-Martin Advanced Technology Center, Palo Alto, CA

Reprinted from *Solar Physics*
Volume 193, Nos. 1–2 (2000)
Volume 195, No. 1 (2000)
Volume 195, No. 2 (2000)
Volume 197, No. 2 (2000)

Springer-Science+Business Media, B.V.

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN 978-94-010-3846-1
DOI 10.1007/978-94-010-0860-0

ISBN 978-94-010-0860-0 (eBook)

Cover illustration: AR9077: Solar Magnetic Arcade. This striking close-up of AR9077 was made by the orbiting TRACE satellite shortly after the flare erupted. It shows million-degree hot solar plasma cooling down while suspended in an arcade of magnetic loops. *Astronomy Picture of the Day, http://antwrp.gsfc.nasa.gov/apod/ap000720.html*

Printed on acid-free paper

TABLE OF CONTENTS

PREFACE

Solar Physics publishes up to two Topical Issues per year that focus on areas of especially vigorous and active research. The present Topical Issue contains papers of recent results on the solar corona, as well as on the transition region and low solar wind. The majority of these papers, which were all refereed in accordance with the standards of Solar Physics, were presented in August 1999 at a workshop held in Monterey, California.

The Sun's magnetic field is responsible for the spectacularly dynamic and intricate phenomenon that we call the corona. The past decade has seen an enormous increase in our understanding of this part of the solar outer atmosphere, both as a result of observations and because of rapid advances in numerical studies. The *Yohkoh* satellite has observed the Sun now for over eight years, producing spectacular sequences of images that convey the complexity of the corona. The imaging and spectroscopic instruments on SOHO have added information on the cooler part of the corona. And since April of 1998 TRACE has given us very high resolution images of the 1–2 MK corona, at cadences that allow detailed observations of field oscillations, loop evolution, mass ejecta, etc.

The papers of this Topical Issue revolve around one key theme: the entire outer atmosphere of the Sun is intrinsically dynamic, evolving so rapidly that even the concept of a single local temperature for a single fluid often breaks down. Moreover, the corona is an intrinsically nonlinear and non-local medium. These aspects are discussed in this Topical Issue, including both papers that review recent developments (both based on observations and on theoretical/numerical modeling), and original research papers based on observations from many different observatories.

We are very grateful to the many referees who were given little time to respond, and to the staff of Kluwer for the production of the topical issues and their reprints. The papers accepted for this Topical Issue add up to such a volume that they have to be distributed over two Topical Issues of Solar Physics (December 1999 and April 2000), which are reprinted in two bound volumes, of which this is the second.