

Preface

The workshop “Nonlinear MHD Waves and Turbulence” was held at the Observatoire de Nice, December 1–4, 1998 and brought together an international group of experts in plasma physics, fluid dynamics and applied mathematics. The aim of the meeting was to survey the current knowledge on two main topics: (i) propagation of plasma waves (like Alfvén, whistler or ion-acoustic waves), their instabilities and the development of a nonlinear dynamics leading to solitonic structures, wave collapse or weak turbulence; (ii) turbulence in magnetohydrodynamic flows and its reduced description in the presence of a strong ambient magnetic field. As is well known, both aspects play an important role in various geophysical or astrophysical media such as the magnetospheres of planets, the heliosphere, the solar wind, the solar corona, the interplanetary and interstellar media, etc.

This volume, which includes expanded versions of oral contributions presented at this meeting, should be of interest for a large community of researchers in space plasmas and nonlinear sciences. Special effort was made to put the new results into perspective and to provide a detailed literature review. A main motivation was the attempt to relate more closely the theoretical understanding of MHD waves and turbulence (both weak and strong) with the most recent observations in space plasmas. Some papers also bring interesting new insights into the evolution of hydrodynamic or magnetohydrodynamic structures, based on systematic asymptotic methods.

We wish to express our special thanks to the lecturers for their stimulating presentations and to all the participants who contributed to the success of this meeting. We also gratefully acknowledge the support of the staff of the Laboratoire Cassini (CNRS UMR 6529) and of the Observatoire de la Côte d’Azur whose contribution was capital in the organization. The workshop benefited from support from CNRS through the Groupes de Recherche “Propagation des Ondes en Milieux Aléatoires ou Nonlinéaires” and “Mécanique des Fluides Géophysiques et Astrophysiques” and from INTAS Project 96-413.

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