

PREFACE

IAU Colloquium 150 *Physics, Chemistry, and Dynamics of Interplanetary Dust* was held at the campus of the University of Florida, in Gainesville Florida, from August 14 to August 18, 1995. The Colloquium brought together 109 scientists from 18 countries. It was sponsored by IAU Commission 21 (Light of the Night Sky), and Commission 22 (Meteors and Interplanetary Dust) and co-sponsored by Commission 15 (Physical Study of Comets, Minor Planets, and Meteorites), Commission 16 (Physical Study of Planets and Satellites) and Commission 20 (Positions and Motions of Minor Planets, Comets, and Satellites). This continued the tradition of holding colloquia at regular intervals to review the progress in the broad range of disciplines used to study interplanetary dust and to help relate progress made through observations, experimentation, and theory. The series started in Honolulu (USA, 1967) followed by Heidelberg (Germany, 1975), Ottawa (Canada, 1979), Marseilles (France, 1984), and Kyoto (Japan, 1990).

Significant progress achieved in several important subdisciplines of our field since the Kyoto meeting made the conference both timely and stimulating. The infrared zodiacal emission has been accurately mapped by the COBE satellite. These data allow the large scale distribution of the interplanetary dust, the solar system dust bands, and other structure to be studied in unprecedented detail. Dust detectors on the Galileo and Ulysses spacecraft probed the dust flux and mass distribution of small particles from 0.7 to 5 AU from the Sun. There have been surprising discoveries of dust flows from the Jupiter system and the flow of interstellar grains through the solar system from the apex direction of solar motion has been observed for the first time. An unprecedented amount of data on large dust particles and meteoroids were obtained by the AMOR radar in New Zealand.

The new data and improved computer power stimulated the development of new strategies for the interpretation of the data and the extraction of clues about the dynamics and sources of interplanetary dust. Modeling has also given new insight into the evolution of debris from asteroid families, trapping in planetary resonances, and the role of collisions. New experimental facilities and theoretical solutions have been developed to study the interaction of realistic dust particles with light and other electromagnetic radiation. Techniques for analyzing interplanetary dust in the laboratory continue to be refined. Complete compositional analysis is now possible on individual submicron grains within an aggregate particle. The results shed new light on the relationships between IDPs and cometary, asteroidal, meteoritic, and interstellar dust. Data from the Long Duration Exposure Facility (LDEF) have provided a new level of definition of the near-Earth particulate environment.

There remain important subjects that were debated at the meeting but on which little or no progress was reported. These include the apparent contradiction between long cosmic ray exposure times of collected dust particles and theoretical predictions for short collisional lifetimes. The high apparent meteoroid ejection velocities from comets, based on the dispersion in meteor streams, is another example. It is our hope that the synthesis of the current state of in-

terplanetary dust and meteoroid research as represented in these proceedings will help expose both strengths and weaknesses in our understanding and thus stimulate study on topics where it is best needed.

The Scientific Organizing Committee was responsible for guiding the scientific content of the meeting and assembling the program of invited talks. These Proceedings include invited reviews, invited contributions, and contributed papers presented at the Colloquium. All of the papers were reviewed by 2 or more referees. We are indebted to the referees for their help in achieving high scientific standards for these Proceedings and we thank all of the authors for the scientific quality of their papers and their careful preparation of the camera-ready manuscripts.

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