PREFACE

Interstellar carbon monoxide (CO) was first detected in 1970 with the 36 foot diameter telescope of the National Radio Astronomy Observatory[1] on Kitt Peak in Southern Arizona. R. W. Wilson, K. B. Jefferts, and A. A. Penzias of Bell Labs reported, "We have found intense 2.6 mm line radiation from nine Galactic sources which we attribute to carbon monoxide."[2] Soon afterward, several other basic molecules were also observed in space. IAU Symposium 170, *CO: Twenty Five Years of Millimeter Wave Spectroscopy,* was organized to commemorate those discoveries. The Symposium reviewed the accomplishments of a quarter century of research on interstellar molecular gas, surveyed the current state of millimeter-wave spectroscopy, and gave a glimpse of what the next 25 years might hold.

Studies of interstellar CO have revolutionized our understanding of the phases and dynamics of the interstellar medium, the initial and final stages of stellar evolution, the chemistry of dense and diffuse interstellar matter and of the solar system, the structure of the Milky Way galaxy, and the content and structure of other galaxies, some very distant. Spectroscopic studies of CO and other molecules are primary tools for investigating all these topics, which are among the most fundamental and active research areas in astrophysics. New developments in instrumentation, including several powerful new telescopes, continue to keep millimeter and submillimeter wavelength radio astronomy at the forefront of research.

Held from May 29 to June 2, 1995, the Symposium drew more than 225 researchers from 19 countries to Tucson. Together with many pioneers of the field, a large group of young astronomers and students participated in the presentations and discussions.

[1] NRAO is a facility of the National Science Foundation, operated under cooperative agreement by Associated Universities, Inc.

[2] *Astrophysical Journal,* **161**, L43.

A highlight of the Symposium banquet was Robert Wilson's account of the CO discovery observations, illustrated with historical slides. To commemorate the occasion, plaques bearing small sections of the original surface of the 36 ft telescope were presented to Wilson, Jefferts, and Penzias.

A Symposium only occurs through the generous contributions of many people. The IAU (through Commissions 28, 33, 34, and 40), URSI, NRAO, SMTO, and AUI all provided sponsorship and support. Our colleagues on the Scientific and Local Organizing Committees provided many hard hours of service. For their work behind the scenes in making the meeting comfortable and enjoyable, we are pleased to thank the NRAO and SMTO staffs, including Nancy and Jeff Clarke, Lisa Engel, Bill Hale, Susan Lake, Inger Neighbours, Matt Waddel, and Dale Webb. We also thank Susanne Aalto, Per Bergman, Chad Englebracht, Valyo Ivanov, Gopal Narayanan, Julio Sancedo, and Milagros Ruiz. Jennifer Neighbours deserves special recognition for her tireless efforts coordinating the Symposium and producing these Proceedings.

A goal of the Symposium was to gather researchers from all branches of millimeter-wave astronomy together to discuss the state of the field. The reviews and contributions recorded in these Proceedings are one aspect of the Symposium. Equally important was the chance for direct, personal interaction between those attending. The Symposium's success will only be measured by the questions and ideas taken away by the participants, perhaps to inspire new discoveries and new insights.

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