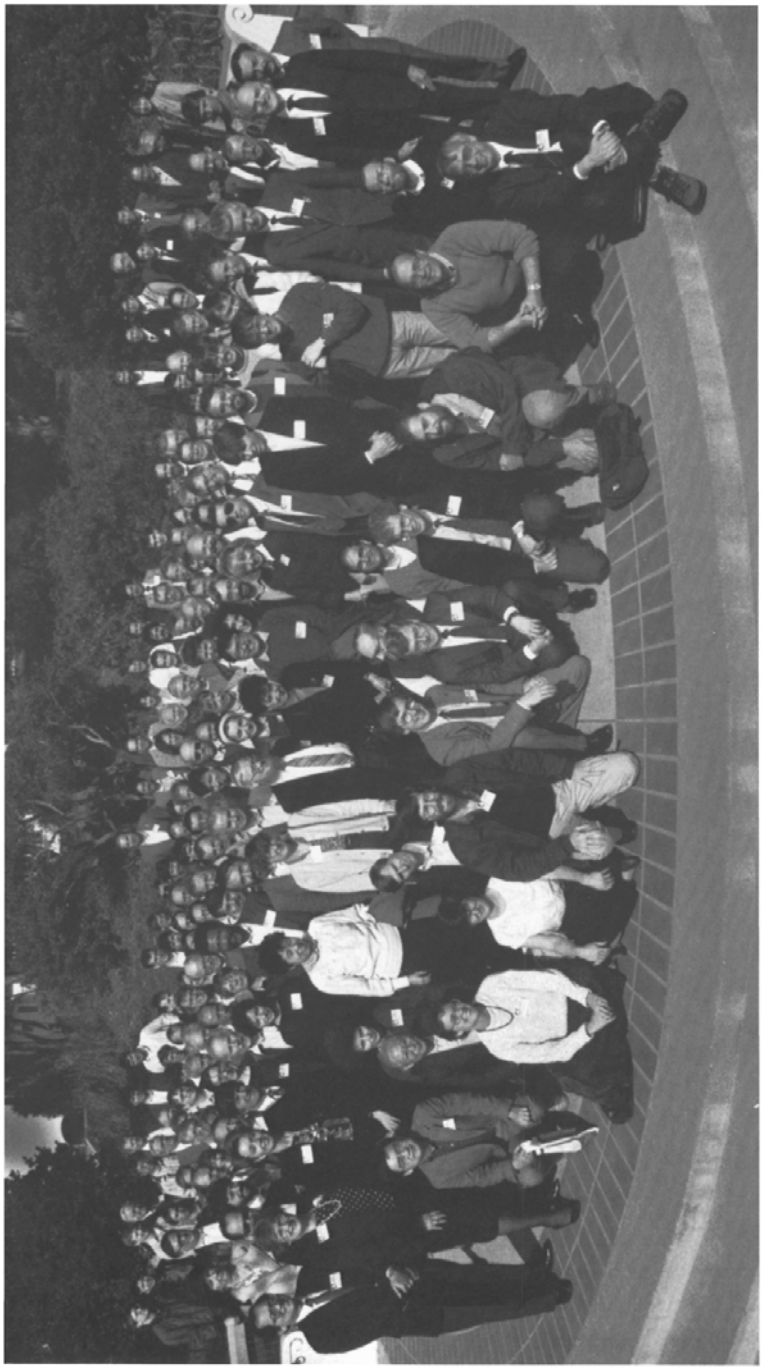
UV and X-ray spectroscopy of astrophysical and laboratory plasmas draws interest from many disciplines. Contributions from international specialists are collected together in this book from a timely recent conference. In astrophysics, the Hubble Space Telescope, Astro 1 and ROSAT observatories are now providing UV and X-ray spectra and images of cosmic sources in unprecedented detail, while the Yohkoh mission recently collected superb data on the solar corona. In the laboratory, the development of ion-trap facilities and novel laser experiments are providing vital new data on high temperature plasmas. Recent innovations in the technology of spectroscopic instrumentation are discussed.

These papers constitute an excellent up-to-date review of developments in short-wavelength spectroscopy and offer a solid introduction to its theoretical and experimental foundations.

UV and X-Ray Spectroscopy of Astrophysical and Laboratory Plasmas



UV and X-Ray Spectroscopy of Astrophysical and Laboratory Plasmas

Proceedings from the
Tenth International Colloquium
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CONTENTS

Tenth International Colloquium
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PREFACE

The papers published with these Proceedings were presented in Berkeley at the tenth in a series of regular colloquia devoted to the interdisciplinary topic of ultraviolet and X-ray spectroscopy of laboratory and astrophysical plasmas. These conferences, which have been held roughly once every three years at various locations around the world, have provided a unique forum for astrophysicists, solar physicists, laboratory plasma experimentalists, and theoretical atomic and molecular physicists to collectively explore fundamental issues in short wavelength spectroscopy that are common to these diverse disciplines. Like its predecessors, the Berkeley conference was very well-attended; we had over 200 participants, far in excess of our initial expectations.

The colloquium came at an especially active time for this field. In particular, several prominent ultraviolet and X-ray satellite experiments had been launched within the year just prior to the meeting that collectively provided a wealth of new ultraviolet and X-ray spectroscopic data on cosmic sources, covering virtually all classes of astronomical systems. Various speakers presented some of the first results from the high resolution spectrograph on the *Hubble Space Telescope*, the high sensitivity far ultraviolet and X-ray spectrometers of the *ASTRO 1 Observatory*, the imaging X-ray spectrometer on the *ROSAT Observatory*, and the high resolution solar X-ray spectrometer on *Yohkoh*. We also heard of substantial progress in laboratory plasma research. The development of ion trap devices had brought about a revolution in laboratory investigations of atomic processes in highly charged atoms. X-ray laser experiments had not only yielded considerable insight into electron ion interactions in hot dense plasmas, but also demonstrated the tremendous versatility of laser plasmas as laboratory X-ray sources. Such measurements also motivated and led to refinements in the development of large-scale atomic and molecular codes. On the instrumental side, the design and development of the next series of very powerful short wavelength observatories had generated a large number of technological innovations in both dispersive and nondispersive spectroscopic instrumentation.

In addition to its scientific success, the conference proved to be a very pleasant affair. We were blessed with exceptional weather (even for Berkeley!), and the two major social events, the reception at the Santa Fe Bar and Grill and the banquet at the Exploratorium in San Francisco, were well-attended and very lively. In addition to the other members of the organizing committees, we are especially indebted to Marjorie Randell-Silver, Beth Saucier, Gloria Staude, Jan Wallace, Kerry O'Connor, Caryl Esteves, Susan Green, and Robin Weissberger for extensive help with the arrangements and for smooth operation of the meeting.

Finally, we would like to thank the National Aeronautics and Space Administration, the California Space Institute, the Lawrence Livermore National Laboratory, the University of California at Berkeley, the Lawrence Berkeley Laboratory, Stanford University, and the Lockheed Corporation for their financial support of the meeting. These funds were especially useful in enabling us to provide assistance in meeting travel expenses for selected attendees, particularly students and those from less well-endowed institutions. A widespread geographic distribution among conference participants was one of the goals of the organizing committees, and we believed that it was at least partially responsible for the intellectual vitality of the colloquium.

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Eric H. Silver
Berkeley, California
July, 1992