

PREFACE

Prominent emission lines are one of the defining features of most types of active galaxies. From the earliest observations, emission lines have played a key rôle in the development of our still-too-meager understanding of these sources; indeed, it was the presence of strong redshifted emission lines in the spectra of objects like 3C 48 that led to the realization that quasars are at cosmological distances and thus opened the door to their use as probes of the distant Universe. Over the subsequent decades, we have come to recognize that active galactic nuclei (AGNs) are characterized by a huge range of luminosity, from objects which are barely discernible against the surrounding starlight of the 'host' galaxy to the highest-power quasars, which out-shine even the most luminous galaxies.

Recent advances in the observational capabilities of both space-based and ground-based telescopes continue to lead to improvements in our understanding of AGNs and possibly related objects such as starburst galaxies. Observations in non-traditional spectral windows are rapidly opening to emission-line spectroscopy, and new high spatial-resolution techniques are providing unprecedented levels of detail in the traditional UV and optical spectroscopic wavebands. Application of new techniques, such as reverberation mapping, and continuing improvements in theoretical approaches are significantly changing long-standing beliefs about the physics of the emission-line regions of active galaxies and allowing us to explore in some detail the geometry, kinematics, and ionization structure of even spatially unresolved regions, as well as to probe the properties of the central energy source. New results on the geometry and kinematics of the narrow-line region, the broad-line region, the X-ray emitting region, and dense neutral regions (such as obscuring tori) might lead for the first time to a unified picture of the structure and dynamics of the gas at all scales in active nuclei, from a few to several million gravitational radii, thus providing insight into the accretion process itself.

IAU Colloquium 159 was held in Shanghai, China, on 1996 June 17–20 for the purpose of discussing many of the new results that have become available in the last several years. The focus of this meeting was on new methods, techniques, instruments, and theoretical issues relevant to the study of emission lines in active galaxies and related sources. This meeting was held at a time when results from new space-based facilities (e.g., *ASCA*, *ISO*, and the refurbished *HST*), improvements in ground-based technology (e.g., three-dimensional imaging spectrometers), and the emergence of new observational techniques (e.g., reverberation mapping) are all beginning to have a major impact. This volume is a collection of nearly all of the papers that were presented at this four-day meeting.

IAU Colloquium 159 demonstrated the power and necessity of spectroscopic observations of AGNs across the electromagnetic spectrum. The field is in a healthy and growing state as there are still many challenging but tractable problems, and this meeting focussed attention on some of the most important potential areas for advances.

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and the International Astronomical Union. We thank once again Scientific Organizing Committee, which did an outstanding job in developing the scientific program for the meeting, and the Local Organizing Committee, which capably handled all the logistical difficulties that arise in large, international meetings. We are very grateful for additional support from the Shanghai Observatory and the University of Science and Technology of China. Nearly all of the meeting communications were done electronically, including registration by the participants, and we are grateful to Richard W. Pogge for preparing and maintaining the World-Wide Web homepage that we used for this purpose, and for generously lending his considerable expertise whenever technical problems arose in preparation of these proceedings. We thank Ellen Hoover, the graphic artist who designed the meeting poster (based on an idea provided by Suzy Collin-Souffrin), and we thank The Ohio State University for underwriting the advertising for the meeting and support of the World-Wide Web site. We also thank Harold McNamara and Liz Holloman of the ASP Conference Series office for help in preparation of these proceedings. Finally, we thank the authors of the many excellent papers that comprise this volume, which we hope will be of continuing value to both students and researchers.

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