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Robert K. Tyson
Michael Hart
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Introduction

Adaptive optics (AO) for astronomical science is a mature technology. The availability of real-time image correction is now the rule rather than the exception on large general purpose telescopes. Scientific output, as measured by the fraction of journal articles that rely on AO, continues to rise, with scientific objectives that address not only quantitative improvements over previous studies, but challenges that *require* the use of AO. Adaptive optics turns the black hole at the center of the Galaxy into a laboratory in which to test the predictions of general relativity. We are learning about the initial mass function of sub-stellar objects, below the mass required for thermonuclear ignition, and extending toward the realm of planets. Increasingly, AO is assuming the role of a workaday tool in the astronomer's kit.

At the same time, the technology of AO is entering an era of specialization. We see a branching out of concepts that build on the basic foundation of wavefront measurement, reconstruction and correction, tailored to address an ever-broadening range of scientific questions. Techniques are being developed to engineer the corrected point spread function in order to deliver the highest contrast ratio for direct detection and characterization of planets around other stars. Image sharpening, over wider fields of view with ground-layer AO, is emerging as a way to compile statistically useful samples of the internal dynamics of high redshift galaxies and to understand distinct populations of stars within our own. Multi-conjugate AO will soon begin to offer imaging at the diffraction limit of our 8 m telescopes over fields of view 2000 resolution elements across. And systems are now being designed and built for the coming generation of extremely large telescopes of 25 m diameter and more that will extend the frontiers of scientific investigation yet further.

This meeting on Astronomical Adaptive Optics Systems and Applications, although modestly sized, brought together papers on many of these topics. The overall importance of continued efforts to break new ground in AO technology was highlighted by the plenary presentation of Dr. Simone Esposito, who described very encouraging high performance results from the AO system running at the Large Binocular Telescope. We heard too from groups developing the tools and instrumentation to find extrasolar planets, and those working to overcome the practical challenges to achieving the promise of advanced AO methods on the large telescopes of today and tomorrow.

We would like to express our thanks to the program committee for their assistance in putting together a successful meeting with a broad view of the present state of

the art. We are particularly grateful to all the authors and presenters for their informative participation, and we look forward to seeing you all again at the next meeting.

Robert J. Tyson
Michael Hart