

PREFACE

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IAU Symposium 173, *Astrophysical Applications of Gravitational Lenses*, was held in Melbourne, Australia from July 9-14, 1995. The Symposium was sponsored by IAU Commissions 47 and 40.

With the discovery by Walsh and collaborators of the first instance of a gravitational lens, the multiply imaged quasar 0957+561, the area of gravitational lensing moved from speculative theory to a major astrophysical tool. Since that time, there have been regular, approximately biennial international meetings both in Europe and in North America, which have specifically focussed on gravitational lensing.

On this occasion, with the blessing of the IAU, the meeting was held at the University of Melbourne in Australia. It was the first international astronomical meeting to be held at the University of Melbourne, and hopefully has given the astronomical community some enthusiasm for trekking half-way round the globe to Australia to discuss their latest work.

Although there are still interesting fundamental questions in the theory of gravitational lensing, we felt that gravitational lensing has now 'come-of-age'. It provides a powerful new method for the study of the mass distributions of a wide range of cosmological objects, for the determination of cosmological parameters and also the possibility of using a 'natural telescope' to study background objects, as envisaged by Zwicky over half a century ago. The meeting was therefore organized to highlight areas of astrophysics where gravitational lensing is currently making an impact, or where we anticipate new results over the next few years.

Undoubtedly the greatest impression was created by the new images from the the Hubble Space Telescope. These images show morphological details in the faint arcs of background galaxies which are blurred by seeing at ground level. These images have driven new theoretical investigations to determine optimal mass inversion techniques for clusters of galaxies. However there was also considerable discussion of the remarkable successes

of the searches for gravitational lensing by compact objects in our own galaxy. It is likely that the model of our galaxy will be substantially revised to take account of these new results. The final talk of the conference was given by Bill Press, who introduced the possibility of gravitationally lensing some of the indigenous Australian fauna. Bill entertained the conference with speculations of future applications of gravitational lensing.

The success of the meeting owes much to the generous financial assistance of some of the major astronomical institutions in Australia: the Anglo-Australian Telescope, the Australia Telescope National Facility, Mount Stromlo and Siding Springs Observatory and the Research Centre for Theoretical Astrophysics. Assistance was also received from the IAU, SUN Microsystems Australia and the Department of Industry, Science and Technology in the Australian Government. We are grateful to the School of Physics at the University of Melbourne, and in particular to Janice Long, Margaret McGregor, Peter Cairns, Victoria Ibbetson, and Catherine Trott for ensuring that the meeting ran smoothly.

Finally, the task of editing the proceedings has been ably and efficiently undertaken by Chris Kochanek and Jackie Hewitt.

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