International Max-Planck research School on Astrophysics at the University of Munich

IMPRS

PhD programme

For the second time, the International Max-Planck Research School on Astrophysics (IMPRS) is accepting applications for its PhD programme. IMPRS is a joint collaboration between the European Southern Observatory, Max-Planck-Institut für Extraterrestrische Physik (MPE), the Observatory of the Ludwig-Maximilians University of Munich (USM) and the Max-Planck-Institut für Astrophysik (MPA). Also participating as associated partners are the Astro-particle physics groups at the Technical University of Munich (TUM) and the Werner-Heisenberg-Institut for Physics (MPP).

IMPRS is offering a highly competitive PhD programme, including lectures, seminars, and a research project supervised by scientists at one of the participating institutions. Course language is English. Students have access to ground- and space-based observatories and instrumentation operated by the participating institutes as well as supercomputers for advanced numerical simulations and theoretical studies. Successful completion of the 3-year programme by meeting LMU requirements leads to a doctoral ("PhD") degree in natural sciences (rerum naturalium) awarded by the Ludwig-Maximilians University of Munich.

Applications for the programme are open to students from all countries world-wide fulfilling the LMU admission requirements. More details on the IMPRS programme and admission requirements can be found at the website http://www.imprs-astro.mpg.de/ . For more information on research and science activities at ESO, please consult http://www.eso.org/projects/ and http://www.eso.org/science/ .

The closing date for applications for the programme starting in September 2002 is January 15, 2002.

Please apply by using the IMPRS application form available on-line (http://www.imprs-astro.mpg.de/admission.html).

Book Review: Reflecting Telescope Optics II, by Ray Wilson

Springer-Verlag, Corrected Second Printing, 2001, ISBN 3-540-60356-5, 554 pages, 240 illustrations, PRICE DM 159,90

Volume I appeared in 1996 and was reprinted with significant corrections in 2000. It deals with the historical development of the reflecting telescope with essentially "classical" technology from its invention up to about 1980 and gives the complete optical design and related theory of virtually all known telescope forms. An interesting addition in the reprint is the recently researched identity of Cassegrain in the Portrait Gallery of App. B.

Volume II appeared in 1999 and deals with all aspects of the technological "revolution" from about 1970–1980 onwards, which allowed the breakthrough of the absolute barriers to further progress both in size and optical quality imposed by the limitations of classical technology. A corrected reprint appeared in mid-2001.

The frontispiece added in the reprint shows one of the 8-metre ESO VLT telescopes, the first 8-metre-class telescope using modern active technology for *monolithic* mirrors; while the unchanged cover shows the two 10-metre Keck telescopes using modern active technology for *segmented* mirrors. These two technologies, in combination, seem set to dominate coming developments of super-large telescopes. Volume II deals with all practical aspects of the production and operation of such telescopes designed for use in the visual and infrared wavebands. All techniques required to build them, in particular for large telescopes, are described in considerable detail.

Chapter 1 gives a description of what is often the most demanding task in such projects, the manufacture of the surfaces of the mirrors. Many of the techniques have not changed considerably over the last years, but are nowadays much more effective owing to the use of computers. New methods like stress and ion beam polishing can be used for special applications or fine tuning, respectively.

The success of the figuring depends critically on the procedures used for the test of the optical surfaces. Computer techniques have completely revolutionised the precision, speed and convenience of test procedures. The method has to be adapted to the type of mirror. Interferometric methods are discussed in detail, also the null systems required to generate aspheric surfaces. Special attention is given to the complex test procedures for convex mirrors. Chapter 2 deals with the test and alignment of the telescope in function. After an introduction to the optical theory of misaligned two-mirror telescopes, an alignment procedure for such telescopes is described in detail. Methods for measuring the quality of telescope optics range from simple methods like the evaluation of defocused images to computer-based procedures such as Shack-Hartmann and curvature sensing.

The central Chapter 3 discusses modern telescope developments which are, in one way or the other, all aimed at overcoming the classical scaling laws for the total mass and related flexure of telescopes as functions of the diameter of the mirror. The four possibilities treated are the use of (usually hexagonal) segments, the coupling of separate telescopes, the light-weighting of the mirrors, or the use of actively controlled thin meniscus mirrors. Whereas most mirrors of large telescopes are made of low-