The Challenge of the Cosmos

Proceedings of the Meeting Organised Jointly by
the National Committee for Astronomy of the Royal Irish Academy and
the Astronomical Science Group of Ireland,
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1 Research Facilities in Astronomy for Irish Scientists

Ground-based Facilities

High-resolution Imaging on La Palma
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Abstract

The resolution obtainable from a large ground-based telescope is determined by the effects of the overlying atmosphere rather than by any intrinsic limitations of the telescope optics. Refractive-index fluctuations generated by atmospheric turbulence at a number of levels in the atmosphere distort an incoming plane wave from a distant astronomical source, with a characteristic scale size, \( r_0 \), which is a measure of the severity of the distortion. In high-resolution imaging one attempts to correct or avoid these effects. In the simplest case one chooses to use a telescope aperture no larger than \( \sim 4r_0 \) in which case the primary effect of the seeing is to cause rapid movement in the focal plane, which, however, may be determined and corrected so long as images are collected on a timescale short compared with the movement. This is called image sharpening. If the full aperture of a large telescope is to be used, other methods, analogous to those used in radio astronomy, are used to de-convolve the distorting effects of the atmosphere from the image.

The Observatory of the Roque de los Muchachos on La Palma is very suitable for high-resolution imaging experiments because (a) the atmospheric quality (seeing) has been shown to be extremely good, and (b) an optical laboratory specifically designed for high-resolution imaging experiments (GHRIL) has been set up on the 4.2m William Herschel Telescope.

A brief description of the new laboratory is given, and some early experimental results from La Palma, demonstrating the quality of the seeing and the effectiveness of high-resolution imaging, are presented.

STARLINK: Electronic Corridor for Astronomers
G.E. Bromage,
Rutherford Appleton Laboratory, UK

The Editors regret that no account of Dr. Bromage’s presentation was available at the time of going to press.

QUBES - A High-resolution Echelle Spectrograph
P.B. Byrne,
Armagh Observatory, Armagh BT61 9DG

The Queen’s University Belfast Echelle Spectrograph (QUBES) has been described previously in this journal (McKeith, 1986). A contract to upgrade the instrument to common-user status, involving computer control of the main spectrograph movements, was awarded by RGO to the present author, along with J.G. Doyle (Armagh) and C.D. McKeith (QUB) in November 1987. The present status of this work was described. It is hoped that the instrument will become generally available on the JKT and INT at La Palma in its new configuration in mid-1989.

Reference

Space-borne Facilities

LYMAN - A New Prospect for Ultraviolet Astronomy
P.B. Byrne,
Armagh Observatory, Armagh BT61 9DG

A description of the proposed ESA LYMAN mission was given and its suitability for a range of studies

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