The Hitchhiker Parallel CCD Camera

A typical large telescope spends a large fraction of its time carrying out spectroscopy on or near to the optical axis. On the other hand, most large telescopes have fields of view much larger than those required by spectroscopic observers. The Hitchhiker camera (so called because it 'hitches a ride' on other peoples' observations) is a novel attempt to make more efficient use of costly large telescope facilities. Permanently installed on the William Herschel Telescope (WHT) at La Palma, Hitchhiker is a dual beam broad band CCD camera which works in parallel with spectroscopic instruments. The instrument was designed and built by the Cardiff group in collaboration with Craig McKay and Nick Rees at the Institute of Astronomy in Cambridge. Numerous members of the RGO staff in the UK and on La Palma assisted with the design and the mounting of Hitchhiker on the telescope. Hitchhiker has so far been used for a total of 12 weeks by various members of the Department of Physics and Astronomy at the University of Wales College of Cardiff, who are responsible for operating the instrument. In due course, we hope to completely automate the instrument control so that no observers actually need to be on site to run the camera.

Since Hitchhiker normally runs in parallel mode, we have no control over the fields of view, so we sample more or less serendipitously around the sky. The actual fields are 7 arc minutes from the object being viewed by the primary scheduled observer, Hitchhiker being operated most frequently in conjunction with the ISIS spectrograph. By use of a dichroic beam splitter and two separate CCDs we survey simultaneously in two bands (either B and R, B and I or V and I). Although the field of view is small in comparison with most other survey instruments (about 6 by 4 arc minutes) we make up for this in terms of the number of frames taken (corresponding to of order 1 square degree a year), the two simultaneous bands and the great depth to which the observations reach. Remember that we are observing in parallel with spectroscopic observers who frequently require extremely long exposure times. A two hour CCD observation on a 4.2m telescope (even with light losses from the additional optical components) enables us to detect objects easily to magnitude 25 in B. During an observing run data is collected at a rate of approximately 1000 Megabytes per week. Routinely reduced data will be stored in an archive (on Exabyte tape at present).

The camera is the first of its kind to be installed on a ground based telescope and we hope it can act as a prototype for a series of similar instruments on the new generation of large telescopes. Implementing similar systems on the new very large telescopes will ensure that the quality of background surveys keeps pace with the advances in telescope technology.

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