



INFORMATION BULLETIN D'INFORMATION

BULLETIN NO. 23

1990 SECOND SEMESTER

Pluto and Charon

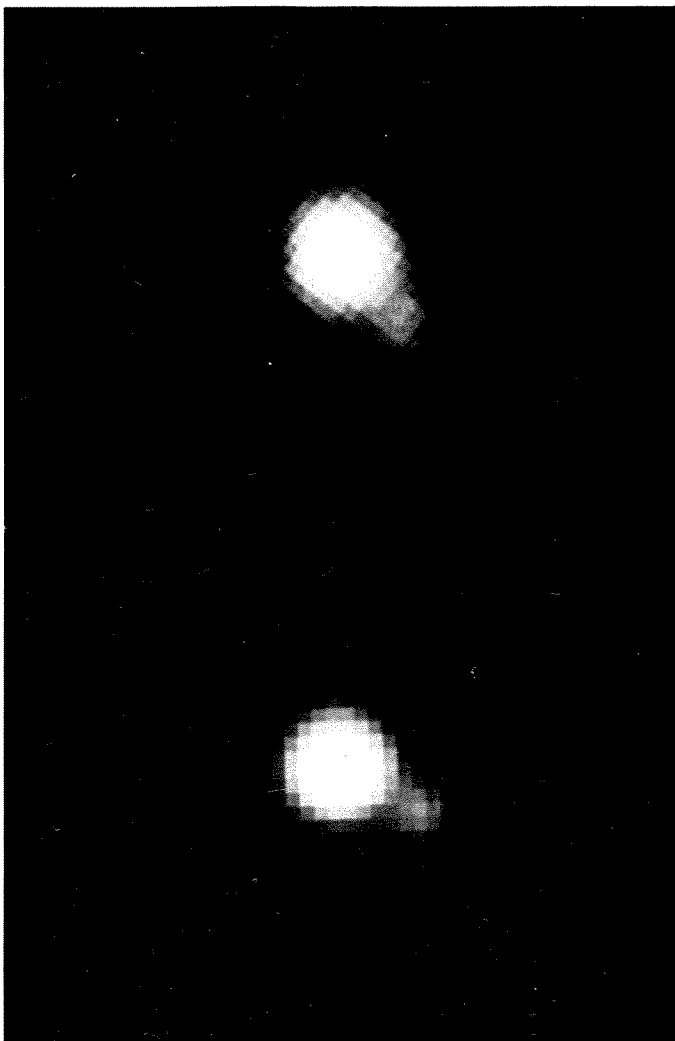


Figure 1: These I band images of Pluto and its satellite Charon, taken during engineering tests of the DAO High Resolution Camera and the SAIC 2 CCD at prime focus, are some of the finest yet obtained of the pair. The 60 second exposure at the top (FWHM = 0.54 arcseconds) was taken using the full 3.6m aperture of the telescope. The bottom image (FWHM = 0.48 arcseconds) was taken with the primary mirror stopped to a 1.2m aperture.

D. Salmon

Important Notice Regarding CFHT Observing Schedule for July 1991

The total solar eclipse of 11 July 1991 is expected to produce severe pressure on airline bookings and accommodations in Hawaii. In anticipation of this, CFHT intends to extend its first semester 1991 observing schedule to include the July dark run (until approximately July 18). Observers who wish to apply for time in the July 1991 dark run must therefore submit their proposals in the upcoming competition (deadline September 1)

R. McLaren

Change of Directors

After eight years spent at CFHT, first as Visiting Astronomer, Resident Astronomer, Associate Executive Director and finally as the Executive Director for the last three years, Robert McLaren will leave CFHT on August 1st. During his term as a director, major achievements included the complete implementation of the HP9000 platforms to control the instruments data acquisition; the implementation of a fast and reliable data link between the CFHT headquarters in Waimea and the Mauna Kea summit; a detector program that gives today's CFHT observer a choice of more than 7 high quality CCDs; the definition and construction of two new major instruments, a new Coude instrument and a multi-object high resolution spectrograph; an image quality program that allowed substantial improvements in the telescope optical quality as well as a better controlled thermal dome environment coupled to an open visiting instrument policy for VHR instruments which provided image quality as good as 0"3 FWHM.

Although Bob leaves CFHT, he will not be far away as he has accepted a position with the Institute for Astronomy of the University of Hawaii, where he will assume responsibility for the astronomical development of Mauna Kea, thus continuing to enrich the scientific influence of the Mauna Kea observatories. The whole CFHT corporation and local friends will join in a "Paniolo Farewell" celebration for Bob and his family July 28, to be held in the heart of the Waimea community at the Hale Kea. We extend a warm Aloha to Bob and his family for their contribution to the growth of the CFHT Corporation and the Waimea community.

Starting August 1st, Guy Monnet will move from Associate Director to Executive Director. Before his arrival at CFHT in Waimea in 1987, Guy was Director at the Observatoire de Lyon. He has been closely involved in the focal reducer and Fabry-Perot instrumentation, with the Marseille instrumentation group, and his primary research interests are in the field of large scale kinematics and evolution of galaxies. Upon his arrival at CFHT Guy was soon deeply involved, among many things, in the definition and supervision of the MOS/SIS spectrograph project and the follow up of the current focal reducers in their PUMA, TIGRE and PALILA applications.

John Glaspey, already at CFHT for almost two years, will assume the position of Associate Executive Director. John came from l'Université de Montréal where he was in charge of the Mt. Mégantic Observatory instrumentation and technical operations. His interests in instrumentation and in high resolution spectroscopy of blue stars led naturally to his supervision of the new CFHT Coude instrument project. The CFHT staff joins to welcome Guy and John to their new positions.

Deep CFHT Quasar Surveys

Introduction

Complete samples of quasars over a wide range of redshifts provide the basis for not only investigations of the quasars themselves, but also for powerful studies of the formation of structure in the Universe and, less directly, of the process of galaxy formation. Various imaging studies exploiting the excellent seeing conditions at the CFHT have shown that nearby quasars are violent events occurring in the nuclei of otherwise normal galaxies. It is thus reasonable to expect that the marked changes in the space density of quasars as a function of redshift are telling us something about

the evolution of galaxies and their environments. The highest redshift quasars must mark the epoch by which time at least some galaxies had begun forming. The problem of detecting quasars against the background of stars and galaxies is relatively straightforward due to their strong emission-line spectra and peculiar colours, but isolating samples which do not contain biases in redshift or limiting magnitude is more difficult.

Figure 2 shows the distribution of quasars as a function of absolute magnitude and redshift derived from all major complete surveys. Our CFHT "grens survey" has contributed a substantial fraction of the points in the fainter populated portions of the diagram with $0.3 < z < 3.5$, and we have just launched a new program to explore the very faint quasar population at moderate to high redshifts as shown by the hatched area of the diagram. Some of the major aims of this project are to determine whether the apparent decline in the numbers of quasars at $z > 2$ is true for all luminosities and, eventually, whether the quasars (and host galaxies) were fewer in number at that epoch or just fainter.

The CFHT Grens Quasar Survey

One of the first instruments commissioned on the CFHT was the blue "grens", a grating-prism-lens combination that allowed low resolution spectra to be obtained simultaneously of all objects in the 55 arcmin prime focus field. Following an initial test of this technique for the detection of quasars (Crampton and Rensing, *PASP*, 94, 440, 1982), it was decided to undertake a more extensive survey, ostensibly to look for groups or clustering among the quasar population. It soon became apparent that the blue grens was ideal for the purpose.

Follow-up spectroscopy with the MMT showed that complete samples of quasars could be easily identified to an apparent magnitude of at least $m = 20.5$ and the blue grens produces a resolution of $\sim 60\text{\AA}$, so even when the redshift is such that only the weaker quasar emission lines are present, they are still distinguishable, and strong-lined quasars are detectable up to $m = 21.5$ via simple visual inspection of 90 minute exposures on 25 x 25 cm IIIaJ plates. The positions and magnitudes of more than 1000 such candidates have already been published (Crampton, Schade and Cowley, *A.J.*, 90, 987, 1987, Crampton et al, *A.J.*, 96, 816, 1988) and the follow-up spectroscopy indicates a very high success rate - 80% of the candidates really are quasars. Automatic machine searches of the plates would allow limits to be set on the completeness of the survey as a function of the equivalent width of the emission lines detected. In order to restrict the time required for the follow-up spectroscopy, a limit of $m \leq 20.5$ was imposed, and at that limit the survey seems to be complete, at least, no one else has found as high a surface density as we have (30 deg^{-2}).

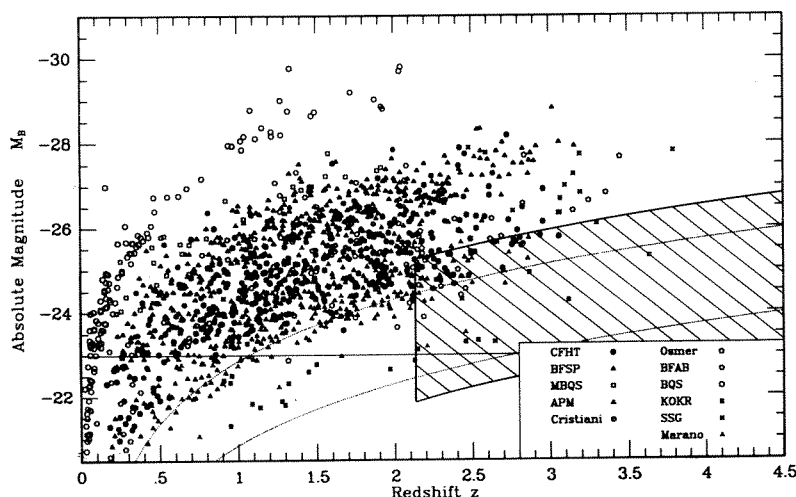


Figure 2: Each point in this diagram represents a quasar detected in one of the major surveys now available. These surveys can be combined to determine the quasar luminosity function and its evolution (this diagram assumes $q_0=0.5$). The curved lines represent lines of constant apparent magnitude $B=21$ and $B=23$ and the apparent structure in the diagram results from the selection limits of the various surveys. The hatched area (which has been poorly sampled by previous surveys) indicates the region where our MOS/PUMA survey has its maximum sensitivity.

So far, redshifts have been obtained for several hundred of the grens quasar candidates. Of these, more than 300 are contained in 6 regions that constitute complete samples: the redshifts of all the quasars brighter than $m = 20.5$ in well-defined areas have been measured. Only one other survey is as large, that of Boyle, Fong,