stars alone will be discovered, an order of magnitude increase on known sources.

Survey Details

The 1800 square degrees will be tiled with 7635 pointings of the WFC, each of which is paired with a second pointing at an offset of 5 arcmin W and S. The purpose of the offset field is to ensure that we cover stars in the gaps between detectors, but also means that the majority of sources are observed at least twice. Each field is to be observed with the Sloan r' and i' filters, plus a narrow band Hα filter, with exposure times of 30s, 10s and 120s respectively. The use of a guide star is not necessary for such short exposure times and is dispensed with to save on overheads, while for each Hα–r'–i' sequence at a given pointing the CCD readout, filter movements, and final telescope movement, are overlapped for additional savings. Finally, human

Figure 1. The crescent nebula, NGC6888, which surrounds the Wolf-Rayet star PPM 84423, seen in Hα emission by IPHAS. Colour image courtesy of Jonathan Irwin.
Not all emission line objects are as easily discovered however and it is crucial that effort is put into understanding the IPHAS colour-colour plane so that future object selections can be made with some confidence. This problem has been attacked on two fronts; through the construction of synthetic photometry using a library of observed flux-calibrated stellar spectra, and by conducting spectroscopic surveys of selected fields as a visual check on predicted spectral types. Figure 4 illustrates the result of this process for a sample field in Cygnus. Several thousand spectra in a number of selected fields have now been amassed using Hectospec on the MMT and AF2 on the WHT. In general this demonstrates that the synthetic photometry is well matched to the observations, although detailed studies of this field, and additional test fields indicate that some further investigation of the calibration for very red objects is required.

IPHAS is also producing new discoveries of nebulae, one of the first to be discovered has been named after the wedding of Su Alteza Real El Príncipe de Asturias Don Felipe de Borbón with Doña Letizia Ortiz Rocasolano which took place around...
the time of the PN's discovery. PNG 126.62+1.32 is a rare quadrupolar nebula, and it was spectroscopically confirmed as a PN in 2004 using the WHT. A deeper image, compared to the discovery image, is shown in Figure 5, which illustrates the initially undetected faint lobes of the nebula.

Besides looking for new nebulae, IPHAS has proved to be exceptionally useful for taking a new look at previously known nebulae; ING users may be familiar with the image of the Wolf-Rayet NGC6888 which adorned the ING Christmas card in 2004 (Figure 1). However Figure 6 shows the spectacular 5°×3.5° mosaic of images covering the supernova remnant S147. Bear in mind that this image, which is binned for the purposes of this article, has immense detail on the arcsecond scale.

To date the survey is approaching its half-way point in terms of completed fields. However as we look forward to the completion of the northern hemisphere survey it’s clear that we are already seeing new discoveries, and generating additional exciting ideas for follow-up science and data mining. For example the colour-colour plane morphologies across the Galactic Plane will provide useful insights into the structure of the northern Milky Way, while linking IPHAS photometry with JHK survey data from 2MASS and the UKIDSS Galactic Plane Survey will add further powerful diagnostic capabilities.

We thank the many observers who have contributed to this programme. Finally, for more complete details interested parties should refer to the first survey paper which is currently in preparation (Drew et al., 2005, to appear in MNRAS), and to the IPHAS home page at http://astro.ic.ac.uk/Research/Halpha/North/.

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