UKIRT:
Current Status and Future Plans

Natonal Astronomy Meeting

20th April 2009

Professor Gary Davis, Director

The United Kingdom Infrared Telescope

Vital Statistics:

- primary diameter 3.8m
- first light 1979
- operates exclusively in the infrared
- Mauna Kea, Hawaii
- funded 100% by the UK
- member of OPTICON
- collaborations with Japan and CEOU (Korea)

UKIRT Operating Modes

Cassegrain
~~25%~~
0%

Wide-Field
~~75%~~
100%

Wide-Field Camera

UFTI

1k x 1k

2.25 sq arcmin

WFCAM

4 x 2k x 2k

745 sq arcmin

Wide-Field Camera

UFTI H2 S(1)

WFCAM J, H, H2 S(1)
central portion of one tile

UKIRT Infrared Deep Sky Survey

- ESO public survey
- >3 magnitudes deeper than 2MASS
- 7,500 square degrees
- 7 year programme, completion in 2012

UKIRT Infrared Deep Sky Survey

Science Goals:

- find the nearest and faintest sub-stellar objects
- break the z=7 quasar barrier
- determine the epoch of re-ionisation
- determine the substellar mass function
- discover Pop II brown dwarfs, if they exist
- construct a galaxy catalogue at z=1 as large as the SDSS catalogue
- measure the growth of structure and bias from z=3 to the present day
- determine the epoch of spheroid formation
- clarify the relationship between quasars, ULIRGs, and galaxy formation
- map the Milky Way through the dust, to several kpc
- increase the number of known Young Stellar Objects by an order of magnitude, including rare types such as FU Orionis stars

Brown Dwarfs

ULAS J0034: 550–600K

ULAS J1335: 500–550K

Both 5–20 M_{Jup}

Leggett *et al.* 2009

Distant Galaxies

First detection at z>6

UKIDSS Papers at this meeting

3	Burningham	LAS	brown dwarfs
3	Steele		sub-stellar companions
3-P03	Baker		brown dwarfs
3-P06	Day-Jones		sub-stellar companions
5	Parish	DXS	galaxy clustering
5	Pearce	UDS	spectroscopic redshifts
6	Jackson		gravitational lensing
H	Gallaway	GPS	methanol masers
H	Lodieu	GCS	IMF
H	Perger	GCS	low-mass objects
N	Patel	LAS	quasar at z>6

Orion

UKIRT helps reveal chaotic and overcrowded stellar nursery

- combined data from WFCAM, Spitzer and IRAM
- first complete census of H_2 flows across the entire Orion GMC

Davis *et al.* 2009

UKIRT's Long-Term Future

Two directions being developed:

- extended and enhanced wide-field imaging
  - *hemisphere-scale survey*
  - *potentially with polarimetry*
  - *potentially with 4k arrays*
- planet detection
  - *Earth-mass planets in habitat*
  - *M dwarfs*
  - *extension of radial velocity te*

UKIRT's Long-Term Future

UKIRT Planet Finder (UPF)

- high-stability, high-resolution echelle spectrograph in YJH
- wide range of astrophysical applications besides planet hunting
- 3yr to build it, cost c.£5M
- 5yr to do the science, 50% of the telescope time
- letter of intent endorsed by STFC
- full proposal now in preparation: decision by end 2009
- led by Hugh Jones (Herts)

Announcement

UKIRT: A British Success Story

A workshop to celebrate UKIRT's achievements over three decades, and to look forward to the future

Royal Observatory Edinburgh

14–16 September 2009