Data Collection	XMMU_J2235_JK_imaging
Release Number	1
Data Provider	Chris Lidman
Date	21/05/2013

Abstract

Deep HAWK-I J and Ks imaging of the X-ray luminous galaxy cluster XMMU J2235.3-2557.

Overview of Observations

The observations consisted of a mosaic of four pointings in two filters, with the centre of the cluster imaged in the four extreme corners of the HAWK-I detector mosaic. Individual exposures lasted 10 seconds in both J and Ks, and 12 (6 for Ks) of these were averaged to form a single image. Between images, the telescope was moved by 10 to 30 arc-seconds in a semi-random manner, and 22 to 45 images were taken in this way in a single observing block. In the cluster centre, which was always imaged, the total exposure times for J and Ks were 10,560 and 10,740 seconds, respectively. The fully processed images contiguously cover a 13' by 13' region at a pixel scale of 0.1065". The image quality varies from 0.3" to 0.7" depending on filter and location. Data were taken under ESO programme ID 60.A-9284(H) as pat of the first HAWK-I science verification run from 05-10-2007 to 15-10-2007.

Release Content

	J	Ks
RA (J2000)	338.83813	338.83813
DEC (J2000)	-25.96190	-25.96190
Exposure time (seconds)	10560	10740
Observing dates (MJD)	54378.03 – 54388.14	54378.07- 54388.26
Seeing (mosaic center)	0.46	0.31
Limiting magnitude (5 sigma, AB)	24.8	24.41

Release Notes

Details of the processing can be found in two papers, Lidman et al. (2008), and Lidman et al. (2013). In short, the procedure used to the process the data was largely standard. In consisted of the following steps:

- Subtraction of dark frames to remove the zero-level offset
- Division by normalised twilight flats to normalise the pixel-to-pixel response
- Object masked sky subtraction using the XDIMSUM package in IRAF
- Normalisation of the detector gains using the instrumental magnitudes of the UKIRT and LCO standards
- Astrometric calibration with SCAMP (v 1.6.2) and SWarp (v 2.17.6)
- The resampled images produced by SWarp were combined using the imcombine task in IRAF (v 2.14).

Image HAWKI.2007-10-05T01:50:55.845 was not used in the Ks band stack.

Data Reduction and Calibration

- Astrometry is based on the USNO-B1 catalogue.
- Zero points (ZPs) were determined from stars in the Persson et al. (1998) standard star catalogue. ZPs from 2MASS stars are 0.04-0.05 mag lower.
- Illumination corrections have not been applied. The effect has been measured to be less than 2% RMS for each chip.

Data Quality

- Internal astrometric residuals measured by SCAMP were 0.01" in both RA and DEC
- Residual photometric offsets between chips (as measured by stars that landed in more than one chip during dithering) were 0.01 mag for J and 0.03 mag for Ks.

Known issues

Since the data were taken over a period of a couple of weeks, the image quality varies across the field of view, more dramatically for Ks-band image than the J-band image. .

Previous Releases

This is the first release

Data Format

Files Types

The data consists of images and exposure maps. An exposure map is the number of images that contributed to each pixel. In the near-IR, where the background dominates the signal, they are similar to inverse variance maps and can be used in the same way as the inverse variance maps are used in SExtractor.

Filter	Image Name	Exposure Map
J	XMMU2235_J_phaseIII_v1.0.fits	XMMU2235_J_phaseIII_expmap_v1.0.fits
Ks	XMMU2235_Ks_phaseIII_v1.0.fits	XMMU2235_Ks_phaseIII_expmap_v1.0.fits

Acknowledgements

Please make reference to the following papers if you use these data: Lidman, C. et al. 2008, A&A, 489, 981 and Lidman, C. et al. 2013, MNRAS, in press (arXiv 1305.1938), and please use the following statement in your articles when using these data:

"Based on data products from observations made with ESO Telescopes at the La Silla Paranal Observatory under programme ID 060.A-9284(H)."

In processing the data, we used IRAF (v 2.14), SExtractor (v 2.8.6), SCAMP (v 1.6.2) and SWarp (v 2.17.6).

References

Lidman, C et al. 2008, A&A, 489, 981
Lidman, C. et al. 2013, MNRAS (in press), arXiv1305.0882
Persson, S. E. et al. 1998, AJ 116, 2475