WFCAM ON-SKY CHARACTERIZATION TESTS

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INTRODUCTION

This document lists the various on-sky tests which will be used to characterise WFCAM as soon as possible after commissioning time, and in some instances during commissioning.

DETECTOR NOISE PROPERTIES

The detectors will be being used in a new mains power environment, attached to a telescope, and may have noise properties different to those measured in the lab. The difference needs to be characterized so that its impact on data reduction can be assessed. This will include:

1. Basic read noise measurements
2. Re-measure the crosstalk matrix
3. Bad pixel stability (need bias and dark frames from the earliest stages of commissioning)
4. Dark current stability
5. Repeatability and level of reset anomaly

SKY EMISSION

Note: in case of measurement of sky properties, the measurement listed is to be carried out in every appropriate filter. Repeatability of filter placement should also be tested, and this can be done in a number of the tests below.

1. Brightness, time variation, spatial scales of the emission.
2. Effect of large spatial offset to a "sky" position.
3. Sky brightness vs. distance from Moon (check for additional contribution from scattered light).
4. Sky brightness as function of zenith distance.

FRINGING

1. Fringe amplitude and stability during change of sky brightness.
2. Variation time and spatial scales, speeds of motion.

SENSITIVITY

Need an early measurement of the sensitivity limit in the standard observing modes. Also should compare coadded images of the same field taken on widely-separated nights. Quantify overheads in standard observing modes.

BACKGROUND LIMIT

Early check of background-limited exposure times.

COSMIC RAYS

Long exposure to pick up a lot of CRs - test whether DR rejects them.

PERSISTENCE

1. Check in a field with a range of point-source brightnesses.
2. Repeat at intervals to check temporal stability.

FLAT FIELD

1. Dome flats (lamp on/off), fading twilight flats - assess usability. Screen and illumination will be provided for this.
2. Nonlinearity from dome flats.
3. Vignetting function and its motion if any. Also includes taking a mesostep sequence.
4. Assess colour dependence of flat field.
5. Assess spatial thermal signature in the K band.
6. Tests of different flat fielding algorithms.
7. Assess flatfield stability (impacts on data taking and reduction strategy).

SCATTERED LIGHT

Observe a field with large numbers of stars, and one with a few bright stars. Quantify the scattered light and ghosting.

AREA CALIBRATION

1. Place a UKIRT faint standard on each chip independently (if possible, in each of the different channels on each chip).
2. Observe a number of the predefined standard fields.

ASTROMETRY

Dead-reckoning coordinate system - first go. Includes the following:

1. Chip and readout orientation.
2. Refine WCS constants.
3. Refine radial distortion model (needed later for more accurate astrometry).
4. Use the same data to check microstepping accuracy.

GUIDING

1. Test guiding in crowded fields.
2. Test guiding in the field of a large, bright object.