

FourStar is the wide-area near infrared camera installed on the Magellan Baade telescope. It has four HAWAII-2RG 2048x2048 detectors for a total of 16 mega-pixels. The pixel scale is 0.159"/pix. for a total field of view of 10.8'x10.8' (5.4'x5.4' per array).

WAVELENGTH COVERAGE: 1- 2.5 microns

DARK COUNT RATE: ~0.3 e-/sec

MINIMUM EXPOSURE TIME: 1.456 secs

READOUT MODES: Correlated Double Sample (CDS) is the normal mode for high background observations. Fowler sampling can also be used. The penalty paid for using this mode is that the total elapsed time for an exposure will be increased by 2\*N\*1.456 seconds.

## ARRAY PARAMETERS

Array ID	Array #1	Array #2	Array #3	Array #4	
Serial Number	SN192	SN204	SN209	SN216	
Well Depth	155,000 e-	143,000 e-	143,000 e-	136,000 e-	
FullWell	Gain (e-/ADU)	2.65	2.59	2.51	2.49
Mode	Read Noise (e-)	25.5	22.1	20.5	18.9
LowNoise	Gain (e-/ADU)	1.38	1.35	1.30	1.29
Mode	Read Noise (e-)	19.4	16.7	16.2	15.1

## TYPICAL BACKGROUND AND ZEROPOINTS

Filter	Typical Background		AB Mag		Vega Mag	
	[e-/s/pix]	[mag/sq"]	Zeropoint	Depth	Zeropoint	Depth
J1 (Y)	200	16.9	27.3	25.4	26.6	24.7
J	850	15.6	27.9	25.7	26.9	24.4
H	4100	13.8	28.1	24.8	26.8	23.5
Ks	3100	13.1	27.9	27.9	25.8	22.7

Depths are the 5.0-sigma background fluctuation within a 0.7" circular aperture in 1hr (no correction for light outside the aperture). Total magnitude for point sources at 0.5" seeing are approximately 0.7mag brighter

## OFFSET PATTERNS

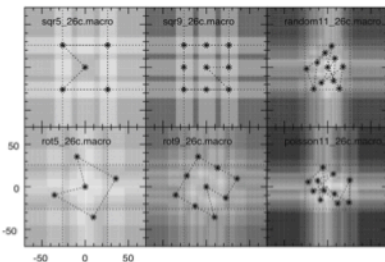


Fig.2 Representative dither patterns available

## SCRIPTS

FSCOM: This script subtracts one image from another and then mosaics the 4 images together to create a quick-look image of the field. It is useful for focus and quick field identification.

FSMOS: This script uses the IRAF task xdmsum to co-add multiple, dithered images and create a background subtracted image for one of the arrays.

For more information: <http://instrumentation.obs.carnegiescience.edu/FourStar/FOURSTAR.html>

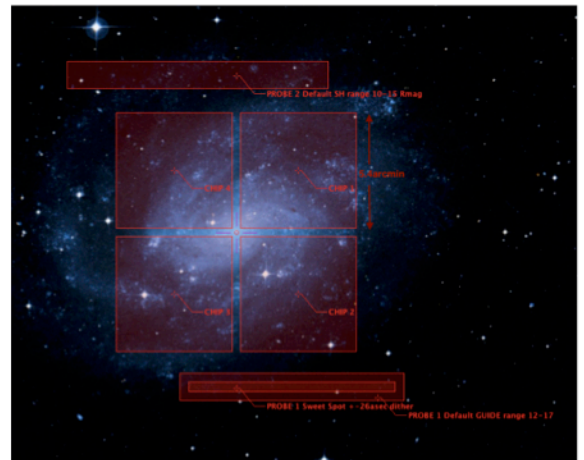
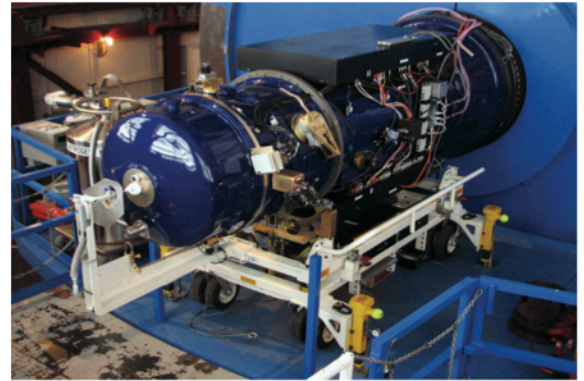


Fig.1 Detector Footprint (mosaic)

## FILTER SET

There are ten available filters: J,H, Ks, J1, J2, J3, Hlong, Hshort, NB1 and NB2. The transmission can be found in the figure below.

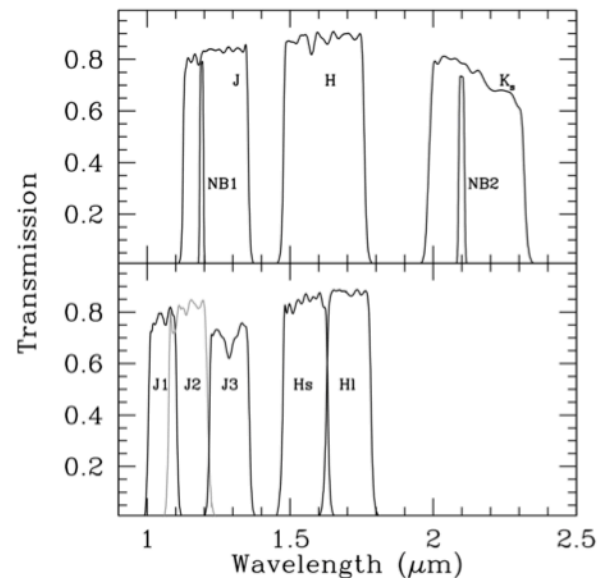


Fig.3 Available Filters