

### WEAVE ETC v. 4.2.3

Assumptions: airmass 1.2, seeing gives Moffat profile with  $\beta=2.5$ , point sources are decentered by 0.1", read noise 3.3 e<sup>-</sup>, no dark current, 3x 18 minute exposures per 1 hour OB.

Wavelength ranges used for throughput averages:

	LR	HR
blue	4000-5900	4130-4550
green		4830-5330
red	6100-9000	6080-6800

Note that the HR mode throughputs are **highly peaked** around the central wavelengths.

**SNR as a function of magnitude**, for different modes. Here, the sky brightness was assumed to be  $\mu_V=21.6$ , except for the MOS HR mode, where  $\mu_V=18.5$  was used, and the seeing was 0.75" (FWHM).

#### MOS LR

mag (point source)	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue (/ $\text{\AA}$ )	S/N red (/ $\text{\AA}$ )
14	189.2	242.8	371.7	374.6
15	118.9	152.7	233.6	235.6
16	74.3	95.7	146.0	147.6
17	45.8	59.3	90.0	91.4
18	27.4	35.8	53.8	55.3
19	15.4	20.6	30.3	31.7
20	7.9	10.9	15.5	16.7
21	3.7	5.2	7.2	8.0

#### MOS HR

mag (point source)	2 x 1 hour OBs (6 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue (/ $\text{\AA}$ )	S/N green (/ $\text{\AA}$ )	S/N red (/ $\text{\AA}$ )
12	251.0	336.3	389.1	1012.3	1234.2	1273.3
13	157.3	211.0	244.1	634.3	774.2	799.0
14	97.6	131.2	152.0	393.4	481.5	497.3
15	59.1	80.0	92.8	238.4	293.5	303.8
16	34.1	46.7	54.4	137.6	171.4	178.1
17	18.1	25.3	29.6	73.1	92.7	97.0
18	8.7	12.3	14.6	35.1	45.3	47.7

#### LIFU LR

surface brightness (avg over fibre)	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue (/ $\text{\AA}$ )	S/N red (/ $\text{\AA}$ )
19	51.0	66.3	100.3	102.2
20	29.1	38.3	57.2	59.1
21	15.2	20.4	29.9	31.5
22	7.2	9.8	14.1	15.1

23	3.1	4.3	6.1	6.7
24	1.3	1.8	2.5	2.8
25	0.5	0.7	1.0	1.1

### LIFU HR

surface brightness (avg over fibre)	1 hour OB (3 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N green ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
18	29.4	40.9	47.9	118.7	150.1	156.7
19	16.3	23.6	28.0	65.9	86.4	91.5
20	8.2	12.5	15.1	33.2	45.8	49.5
21	3.8	6.0	7.4	15.1	21.9	24.2
22	1.6	2.6	3.3	6.4	9.6	10.8
23	0.7	1.1	1.4	2.6	4.0	4.5
24	0.3	0.5	0.6	1.1	1.6	1.9

### mIFU LR

surface brightness (avg over fibre)	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
17	68.1	87.7	133.8	135.4
18	41.8	54.2	82.2	83.6
19	24.8	32.5	48.7	50.2
20	13.7	18.4	27.0	28.4
21	6.9	9.5	13.6	14.7
22	3.2	4.5	6.2	6.9
23	1.3	1.9	2.6	3.0
24	0.6	0.8	1.1	1.2

### mIFU HR

surface brightness (avg over fibre)	2 x 1 hour OBs (6 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N green ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
17	33.9	46.8	54.7	136.7	171.7	179.0
18	19.3	27.6	32.7	77.9	101.3	106.9
19	10.1	15.2	18.4	40.6	55.7	60.1
20	4.8	7.6	9.4	19.2	27.8	30.8
21	2.1	3.4	4.4	8.3	12.6	14.3
22	0.9	1.4	1.9	3.4	5.3	6.1
23	0.3	0.6	0.8	1.4	2.2	2.5

SNR as a function of sky brightness, for different modes. Again, the seeing was assumed to be 0.75" (FWHM).

### MOS LR, V=20

Sky brightness (V mag/arcsec <sup>2</sup> )	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
18	2.9	3.8	5.8	5.8
18.5	3.6	4.6	7.0	7.2

19	4.3	5.6	8.5	8.7
19.5	5.1	6.7	10.0	10.4
20	5.9	7.8	11.6	12.1
20.5	6.6	8.9	13.0	13.8
21	7.3	9.9	14.3	15.3
21.5	7.8	10.7	15.3	16.5
22	8.2	11.3	16.1	17.5

**MOS HR, V=17**

Sky brightness (V mag/ arcsec <sup>2</sup> )	2 x 1 hour OBs (6 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue (/Å)	S/N green (/Å)	S/N red (/Å)
18	16.7	23.1	27.0	67.3	84.8	88.5
18.5	18.1	25.3	29.6	73.1	92.7	97.0
19	19.3	27.0	31.7	77.7	99.0	103.7
19.5	20.1	28.3	33.3	81.0	103.8	108.9
20	20.7	29.2	34.4	83.4	107.1	112.5
20.5	21.1	29.8	35.1	85.0	109.4	115.0
21	21.3	30.2	35.6	86.0	110.9	116.6
21.5	21.5	30.5	36.0	86.7	111.9	117.7
22	21.6	30.7	36.2	87.2	112.5	118.4

**LIFU LR,  $\mu_V=23$**

Sky brightness (V mag/ arcsec <sup>2</sup> )	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue (/Å)	S/N red (/Å)
18	0.8	1.1	1.6	1.6
18.5	1.0	1.3	2.0	2.0
19	1.3	1.6	2.5	2.5
19.5	1.5	2.0	3.0	3.1
20	1.9	2.5	3.7	3.8
20.5	2.3	3.0	4.5	4.6
21	2.7	3.6	5.2	5.5
21.5	3.0	4.2	6.0	6.5
22	3.4	4.8	6.7	7.4

**LIFU HR,  $\mu_V=22$**

Sky brightness (V mag/ arcsec <sup>2</sup> )	1 hour OBs (3 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue (/Å)	S/N green (/Å)	S/N red (/Å)
18	0.7	1.0	1.1	2.9	3.6	3.8
18.5	0.8	1.2	1.4	3.4	4.4	4.6
19	1.0	1.4	1.7	4.1	5.3	5.6
19.5	1.2	1.7	2.0	4.7	6.3	6.7
20	1.3	2.0	2.4	5.2	7.2	7.8
20.5	1.4	2.2	2.7	5.7	8.1	8.9
21	1.5	2.4	3.0	6.1	8.9	9.9
21.5	1.6	2.6	3.3	6.4	9.5	10.7

22	1.6	2.7	3.4	6.6	10.0	11.3
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**mIFU LR,  $\mu_V=23$**

Sky brightness (V mag/ arcsec <sup>2</sup> )	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
18	0.4	0.5	0.8	0.8
18.5	0.5	0.6	1.0	1.0
19	0.6	0.8	1.2	1.2
19.5	0.7	1.0	1.5	1.5
20	0.9	1.2	1.7	1.8
20.5	1.0	1.4	2.0	2.2
21	1.2	1.7	2.3	2.6
21.5	1.3	1.9	2.6	2.9
22	1.4	2.1	2.8	3.2

**mIFU HR,  $\mu_V=22$**

Sky brightness (V mag/ arcsec <sup>2</sup> )	2 x 1 hour OBs (6 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N green ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
18	0.5	0.7	0.8	1.9	2.4	2.6
18.5	0.5	0.8	1.0	2.2	2.9	3.1
19	0.6	0.9	1.1	2.5	3.4	3.7
19.5	0.7	1.1	1.3	2.8	3.9	4.3
20	0.8	1.2	1.5	3.0	4.4	4.8
20.5	0.8	1.3	1.6	3.2	4.8	5.4
21	0.8	1.4	1.8	3.3	5.1	5.8
21.5	0.9	1.4	1.9	3.4	5.3	6.1
22	0.9	1.5	1.9	3.5	5.4	6.3

**SNR as a function of seeing**, for MOS modes. Here, the sky brightness was assumed to be  $\mu_V=21.6$  for the MOS LR mode and  $\mu_V=18.5$  for the MOS HR mode.

**MOS LR,  $V=20$**

Seeing (" , FWHM)	1 hour OB (3 exposures)			
	S/N blue (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
0.75	7.9	10.9	15.5	16.7
1.4	4.3	6.1	8.5	9.4
2	2.6	3.7	5.2	5.8

**MOS HR,  $V=17$**

Seeing (" , FWHM)	2 x 1 hour OBs (6 exposures)					
	S/N blue (/pix)	S/N green (/pix)	S/N red (/pix)	S/N blue ( $\text{\AA}$ )	S/N green ( $\text{\AA}$ )	S/N red ( $\text{\AA}$ )
0.75	18.1	25.3	29.6	73.1	92.7	97.0
1.4	10.2	14.5	17.1	41.3	53.2	55.9
2	6.3	9.0	10.7	25.4	33.1	34.9