



# HMI Observables Requirements - 1



General Requirements			
MRD	Observable	Filtergram	Instrument
1.3.1	Angular resolution: 1.5(1.0)"	Angular resolution: 1.5(1.0)"	Aperture: 14cm
1.3.2			Jitter: 0.1"
3.2.1		Square pixels 0.5"	CCD pixels: 4096 <sup>2</sup>
3.2.2	Full disk	FOV: 2000" x 2000"	CCD pixels: 4096 <sup>2</sup>
1.2.1	99% complete	99.99% complete	Packet loss: 0.01%
1.2.2	95% of the time	95% of the time	

Continuum Intensity Requirements			
MRD	Observable	Filtergram	Instrument
	Cadence: 50(45)s	I framelist: 50(45)s	CCD readout speed: 3.4s
	Noise: 0.3%	Intensity noise: 0.3%	Full well: 125ke <sup>-</sup>
2.5.8.5	Pixel to pixel accuracy: 0.1%	Flat field knowledge	Offset pointing

Numbers in ( ) are goals. \*indicates TBD. Most numbers are 1 $\sigma$ .



# HMI Observables Requirements - 2



Velocity Requirements			
MRD	Observable	Filtergram	Instrument
1.6.1	Cadence: 50(45)s	V framelist: 50(45)s	CCD readout speed: 3.4s
1.5.1	Noise: 25(13)m/s	Intensity noise: 0.6(0.3)%	Full well: 30(125)ke <sup>-</sup>
		Filter width: 76 mÅ	Element widths
		Small sidelobes	7 elements
3.2.3 5.2.5.4	Disk averaged noise: 1(0.1)* m/s	$\lambda$ repeatability: 0.3(0.03) mÅ	HCM repeatability: 60(6)''
		Exposure knowledge: 200(20)ppm	Shutter: 50(5) $\mu$ s
		Each cycle same $\lambda$ 's	Two cameras
		Effective $\lambda$ knowledge	Orbit information
2.1	Absolute: 10* m/s	$\lambda$ accuracy: 3 mÅ	HCM accuracy: 10'
			Filter uniformity, drift
1.5.1	Range: $\pm 6.5$ km/s (and $\pm 3$ kG)	Tuning range: $\pm 250$ mÅ	3 tuned elements
		Filtergrams @ 5 or 6 $\lambda$	CCD readout speed: 3.4s



# HMI Observables Requirements - 3



<b>Line-of-sight Field Requirements</b>			
<b>MRD</b>	<b>Observable</b>	<b>Filtergram</b>	<b>Instrument</b>
<b>1.6.2</b>	Cadence: 50(45)s	LOS framelist: 50(45)s	CCD readout speed: 3.4s
		LCP+RCP each cycle	LCP & RCP available
<b>1.5.3</b>	Noise: 17(10)G	Intensity noise: 0.5(0.3)%	Full well: 40(125)ke <sup>-</sup>
		High effective Landé g	FeI 6173Å (g=2.5)
<b>1.5.2</b>	Zero point: 0.3(0.2)G	λ repeatability: 0.18(0.12) mÅ	HCM repeatability: 36(24)'' or No move LCP↔RCP
		Exposure knowledge: 120(80)ppm	Shutter: 30(20)μs
<b>1.5.4</b>	Range: ± 3(4)kG (and ± 6.5km/s)	Tuning range: ±250mÅ	3 tuned elements
		Filtergrams @ 5 or 6 λ	CCD readout speed: 3.4s

<b>Vector Field Requirements</b>			
<b>MRD</b>	<b>Observable</b>	<b>Filtergram</b>	<b>Instrument</b>
<b>1.2.4</b>	Cadence: 600(90)s	Vector framelist: 600(90)s	CCD readout speed
		4 states each cycle	4 states available
<b>1.5.5</b>	Polarization: 0.3(0.22)%	Intensity noise: 0.4(0.3)%	Full well: 70(125)ke <sup>-</sup>