



# IFU-M Capabilities



# IFU-M Capabilities Overview

- ❑ Integral Field Units for M2FS.
- ❑ Three fiber-fed IFUs: Low Surface Brightness (LSB), Standard-seeing (STD), High Resolution (HR).
- ❑ IFUs user-deployable but only one can be used at a time.
- ❑ Optical Layout: Hexagonal lenslet array defines field. Barlow lenses modify field scale to make lenslets, fiber mounts more manageable.
- ❑ Occultors (focal plane masks) available to block bright sources in field.
- ❑ User-selected slit mechanism to choose spectral resolution (at cost of light loss).
- ❑ IFU-M fibers feed MSpec (the spectrograph for M2FS) and can use all MSpec features (order isolation, spectral resolutions, CCD configs, etc.)

# IFU-M Parameters

IFU Designation:	<b>LSB</b>	<b>STD</b>	<b>HR</b>
Dimension (spaxels):	18x20 (360)	23x24 (552)	27x32 (864)
Fiber Diam (microns):	260	150	75
Input f-ratio (Barlow Lens):	16.5	18.0	30.0
Spaxel Pitch (mm):	0.99	0.62	0.51
<b>(arcsec):</b>	<b>1.90</b>	<b>1.09</b>	<b>0.54</b>
Covering Fraction (min):	94%	90%	88%
(effective: TBD):	97%	93%	91%
Field Dimension (mm)	17.0x16.3	13.6x12.3	13.1x13.4
<b>(arcsec):</b>	<b>32.7x31.4</b>	<b>23.9x21.6</b>	<b>13.9x14.2</b>
Field Area (arcsec <sup>2</sup> ):	1027	516	197

# IFU-M: Features and Expected Performance

IFU Designation:	<b>LSB</b>	<b>STD</b>	<b>HR</b>
Occultors (diam, <b>arcsec</b> ):	2.0, 3.0	1.5, 2.6	1.0, 2.0
Slits (microns):	260, 175, 80	150, 80	75
Resolution:			
LoRes	1000, 4000	2000, 3500	5000
MedRes	4000, 7000, 15000	8000, 14000	18000
HiRes	12000, 22000, 36000	22500, 36000	38000
Sensitivity:			
(V-band)			
(5 $\sigma$ , 2 hrs)			
LoRes	23.5 (24.7)	22.3 (22.1)	21.0 (19.2)
MedRes	22.3 (23.5)	21.1 (20.8)	19.4 (17.6)
HiRes	21.6 (22.8)	20.3 (20.0)	18.8 (17.0)
ADC:	System ADC available for all IFUs		
Wavelength Range:	370-950 $\mu m$ . Specific range defined by blocking filter and spectroscopic mode: $\Delta\lambda/\lambda = 2\%$ ( <i>HiRes</i> ), 8% ( <i>MedRes</i> ), 40% ( <i>LoRes</i> )		
Calibration:	Standard continuum/line sources for all spectroscopic modes		
Guiding/Active Optics:	Standard NAS-E Magellan guider and SH system		



# IFU-M: Capability Space (Spectral Resolution, Area Coverage, Spatial Sampling)

