

MUSE opto-mechanical design and performance

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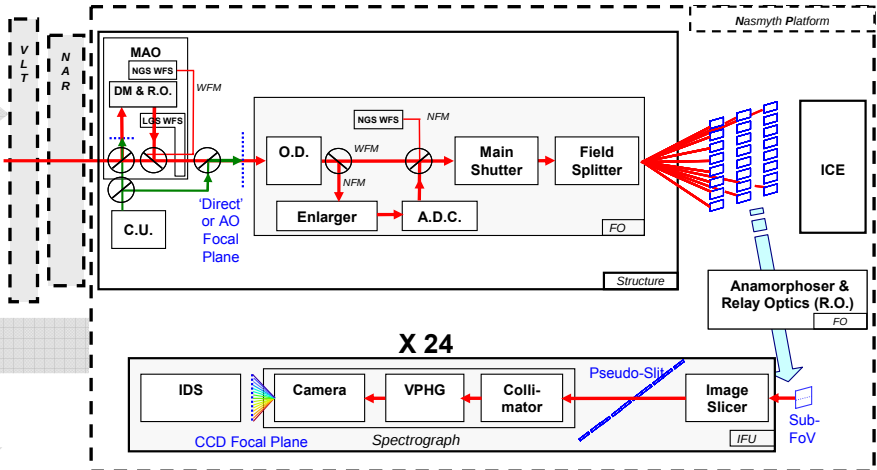
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INSTRUMENT REQUIREMENTS

SCIENTIFIC REQUIREMENTS		
Angular FoV dimensions	1 x 1 arcmin in WFM, 7.5 x 7.5 arcsec in NFM	
Angular sampling	0.2 arcsec in WFM, 0.025 arcsec in NFM	
Simultaneous spectral range	From 0.465 to 0.93 μ m	
Spectral resolution	2000 at 0.465 μ m (primary wavelength)	
	3000 at 0.70 μ m (primary wavelength)	
	4000 at 0.93 μ m	
Image quality	80 % of energy within a square of 0.35 arcsec width in WFM, 80 % of energy within a square of 0.056 arcsec width in NFM	
Optical transmission	≥ 20 % end-to-end (but excluding atmospheric absorption)	
VLT INTERFACE REQUIREMENTS		
Telescope pupil diameter	8 m	
Telescope F/D number	15	
FOCAL PLANE CHARACTERISTICS		
Total number of focal planes	24	
Pixel number (per focal plane)	4096 x 4096	
Pixel/sample	1 along cross-dispersion direction, 2 along dispersion direction	
Pixel size	15 μ m	
Output F/D number	1.93	

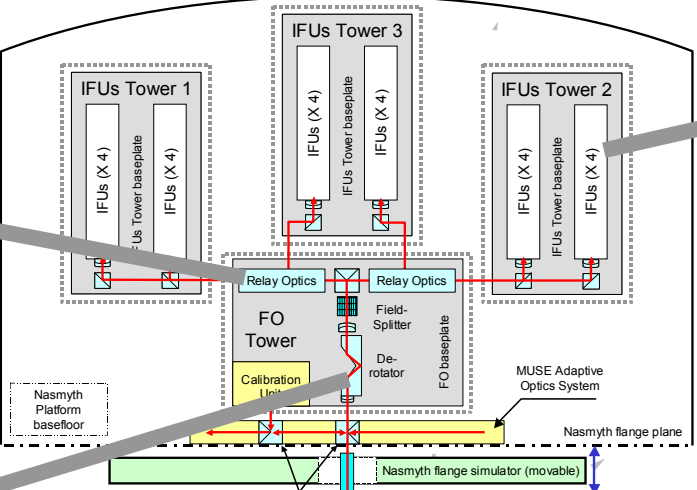
MUSE block-diagram



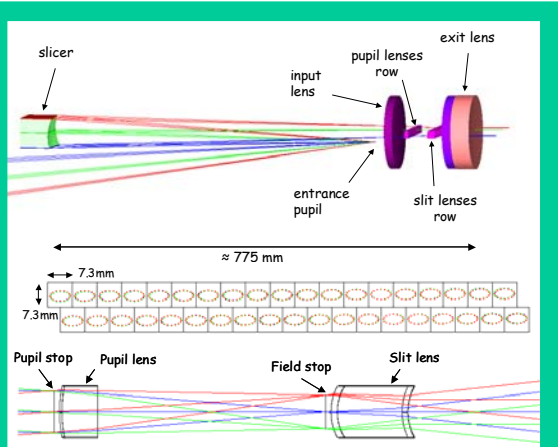
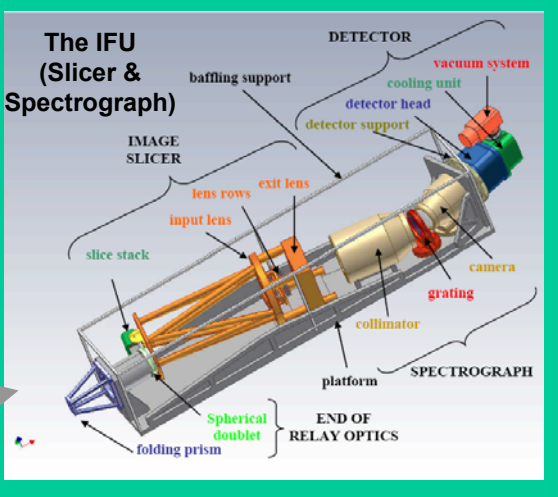
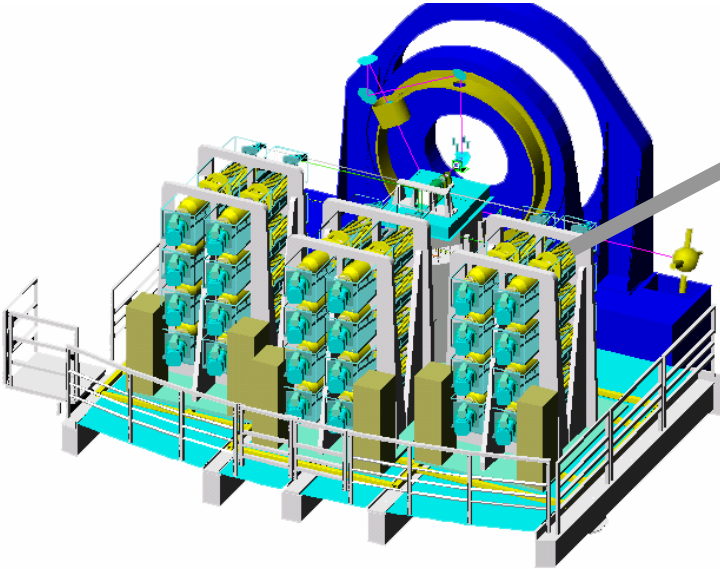
Subsystems requirements

IMAGE QUALITY			
Fore-Optics	Image Slicer	Spectrograph	CCD
Enclosed Energy ≥ 90 % - in 0.2 " square on-sky - in 805 x 1610 μ m rectangle (at FO image plane)	Enclosed Energy ≥ 85 % - in 0.2 " square on-sky - in 35 x 70 μ m rectangle (at ISS image plane)	Enclosed Energy ≥ 85 % - in 0.2 " square on-sky - in 15 x 30 μ m rectangle (at focal plane)	Flatness ≤ 20 μ m Peak to Valley
LATERAL STABILITY (RMS on 1 hour duration)			
VLT Nasmyth focus	Fore-Optics image plane	Image Slicer slit plane	Spectrograph focal plane
± 5 μ m	Structure ± 20 μ m De-rotator ± 125 μ m	± 5 μ m	± 3 μ m

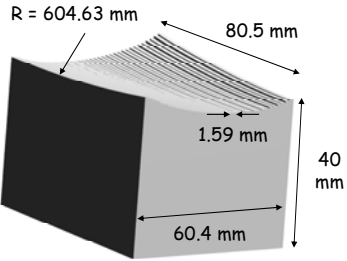
MUSE overall architecture



MUSE on VLT Nasmyth platform



Advanced "catadioptric" Image Slicer



MUSE CONSORTIUM



INSTRUMENT PREDICTED THROUGHPUT

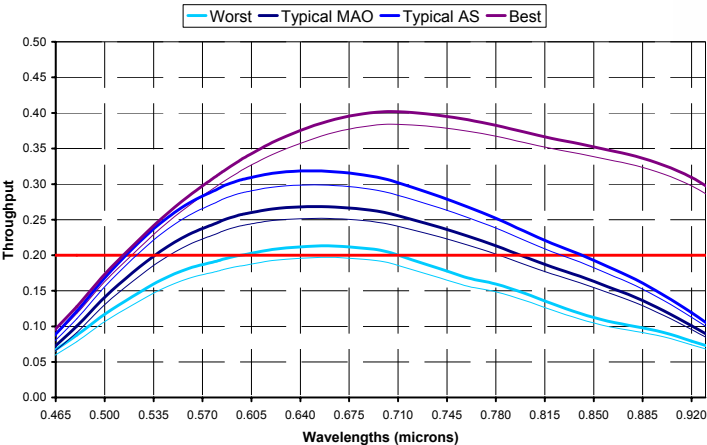


IMAGE QUALITY (Wide Field Mode)									
Enclosed Energy (%)	Fore-Optics			Image Slicer			Spectrograph		
Field of View Requirement	Centre	Intern.	Edge	Centre	Intern.	Edge	Centre	Intern.	Edge
0.465 μ m	96.1	96.6	96.7	95.1	93.3	89.7	77.6	84.2	85.3
0.650 μ m	94.2	95.1	95.1	92.3	92.6	92.1	94.5	90.7	89.8
0.800 μ m	92.5	93.6	93.6	91	91.1	91.7	95.8	94.5	94
0.930 μ m	92	93	93	90.5	90.7	90.9	73.7	87	77.2