MMIRS: MMT and Magellan Infrared Spectrograph

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MMIRS Modes

Imaging

Field of view is 7’ x 7’, 0.2”/pixel, 2048^2

Bands Y, J, H, Ks

Maximum single exposure times

- Y 120 seconds
- J 60 seconds
- H 15 seconds
- Ks 20 seconds

Dithering

Standard dither patterns are available, e.g., random 30” x 30”

Need to stay in place for about 1 minute to guide / WFS properly

Custom dither patterns can be made for extended objects (<1°)

MMIRS Modes

Single Object or Multi-Object Spectroscopy

Field of view is 4’ x 7’, Resolution: 1200-3000
Coverage in various modes: 0.95-2.45µm

Slits: short, long, 1-12 pixels
Filters: Y, J, zJ, H, HK, HK3, Kspec
Grisms: J,~~H~~, H3000, HK, K3000
Not all combinations are supported by the auto-pipeline

Dithering Single Slit: 5, 7 (default), 10, 15, 20, 30, 60, 120, 210”

Dithering MOS: 1.8”-1.4” ABA’B’, 1.6”-1.2” ABA’B’, 2.0”-1.6” ABA’B’

Maximum single exposure time: 300 seconds

MMIRS Modes

Single Object or Multi-Object Spectroscopy

Table 1
Grisms and filter combinations available as of October 2014 and their support status in the MMIRS pipeline v 1.0.

Grism	Filter	Sp.Res (R)	λ, μm	Supported
J	J	2200	1.15 – 1.35	yes
J	zJ	2200	0.95 – 1.50	yes
~~H~~	~~H~~	2300	1.50 – 1.80	yes
~~H~~	~~HK~~	2300	1.25 – 2.15	yes
HK	$HK/HK3$	1200	1.25 – 2.45	yes
$H3000$	H	3000	1.50 – 1.80	planned
$K3000$	$Kspec$	3000	1.90 – 2.45	~~planned~~ yes
HK	zJ	2400	0.95 – 1.50	no
HK	Y	3000	0.95 – 1.10	no

MMIRS Capabilities

The Exposure Time Calculators are being updated right now (e.g., no K3000)

https://lweb.cfa.harvard.edu/mmti/mmirs/exptime.html
https://lweb.cfa.harvard.edu/mmti/mmirs/Calibration/SNMMIRS/

PEARLS (Prime Extragalactic Areas for Reionization and Lensing Science; Christopher Willmer) in the JWST North Ecliptic Pole Time Domain Field

For on-target science exposures of ~4, 7, 6, 10 hours in Y, J, H, Ks
Field 200-300 arcmin^2

- Y 23.8 (95%), point source
- J 23.53
- H 23.13
- Ks 23.33

MMIRS Capabilities

The Exposure Time Calculators are being updated right now (e.g., no K3000)

https://lweb.cfa.harvard.edu/mmti/mmirs/exptime.html
https://lweb.cfa.harvard.edu/mmti/mmirs/Calibration/SNMMIRS/

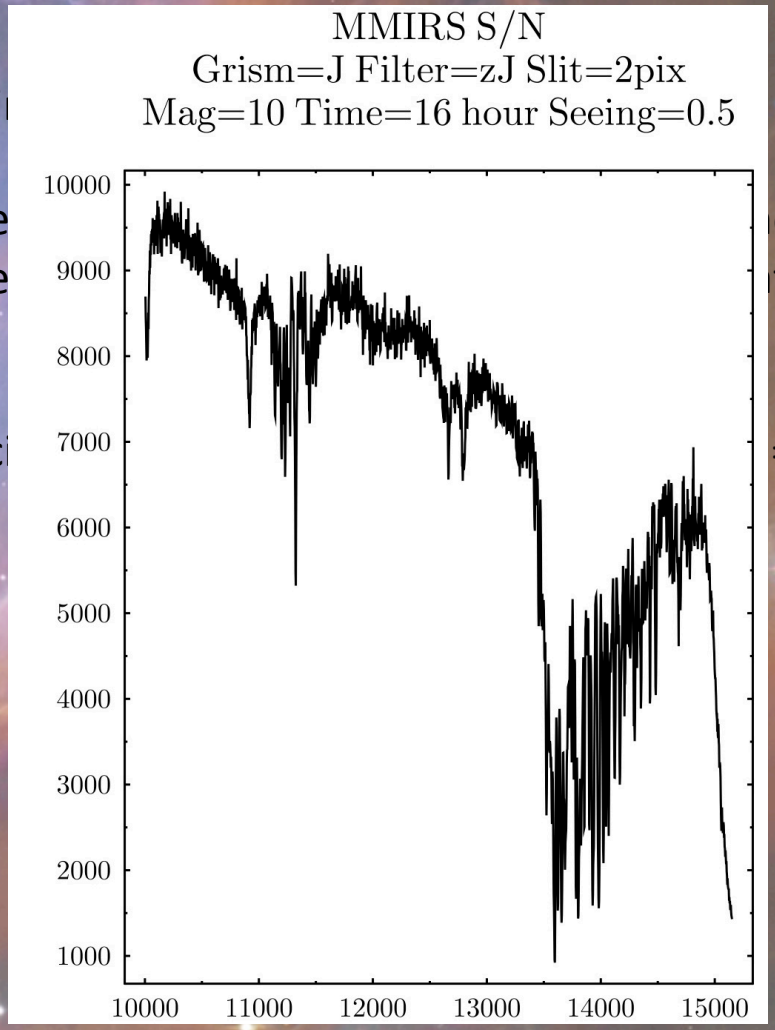
For on-target science exposures of 1 hour, R=3000, S/N=10, ~20th magnitude

MMIRS Capabilities

The Exposure Ti now (e.g., no K3000)

https://lwe e.html
https://lwe tion/SNMMIRS/

For on-target sc =10, ~20th magnitude



MMIRS Data Pipelines

Imaging

- Raw data available the next morning
- Moving towards using SAO pipeline, but requires supervision
- POTPyRI: Pipeline for Opt/IR Telescopes in Python for Reducing Images
  https://github.com/CIERA-Transients/POTPyRI

Single Object or Multi-Object Spectroscopy

- Raw data available the next morning
- Auto pipeline run by SAO available within 1-2 days
- Some support for reducing data on your own with the SAO pipeline
- PypeIt also supports multi-object reduction (some modes tested)