

# No Photon Left Behind!

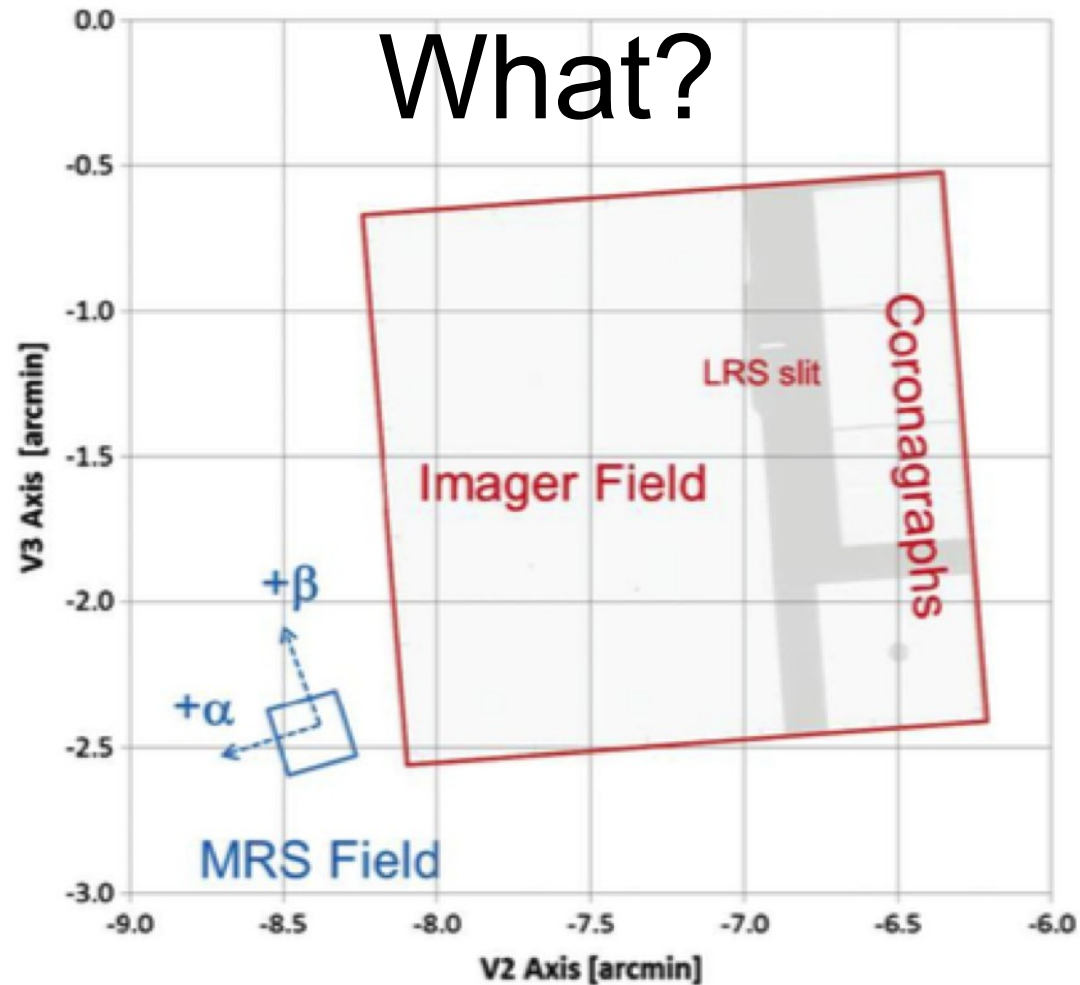
## Serendipitous Asteroid Science

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One-minute summary:  
Please, use SIMO for all MRS observations!  
Filter F1280W, <11 frames per ramp

# What?



- Imager can observe simultaneously with MRS

## MRS Parameters

Primary Channel

ALL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	ALL	Negative

Add

Duplicate

Insert Above

Remove

Simultaneous Imaging Imager Subarray

Wavelength

Science Exposures

YES

FULL

ALL

ALL generates an exposure for each of SHORT, MEDIUM and LONG, all with the same

#	Detector	No. of Exposu...	Filter	Readout Patte...	No. of Groups	No. of Integra...	Photon Collec...	Dither
1	IMAGER	1	F1280W	FAST	5	3	41.626	Dither 1
1	LONG	1		FAST	5	3	41.626	Dither 1
1	SHORT	1		FAST	5	3	41.626	Dither 1



Exposure Parameters

# Why?

- Doesn't cost any extra telescope time → “Data for free”.  
Enabled in APT by default. Please don't disable (unless you have a good reason)!
- Science case: asteroid serendipity

# Asteroid Serendipity

- Asteroids are very bright in MIR, will show up serendipitously.



- That way, the WISE spacecraft has characterized ~150,000 known asteroids (and discovered a few hundred new ones).
- Ryan et al. (2009): serendipitous asteroid detections with IRAC. Extrapolate to MIRI at

# SIMO parameters

- Optimum imager filters (SED/sensitivity):  
F1280W  
F1000W (~15% worse except for warm objects)
- Saturation? Make sure there's overlap with WISE, i.e., faintest WISE asteroids don't saturate MIRI. → < 11 FAST frames per ramp ("groups" in APT speak)
- Smearing due to apparent motion: typically  $\leq 10$  mas/s (in main belt) → 4 frames to cross MIRI pixel  
(but F1280W PSF  $\gg 1$  pixel)