

The 4MOST Time-Domain Extragalactic Survey (TiDES)

Rubin early science and commissioning

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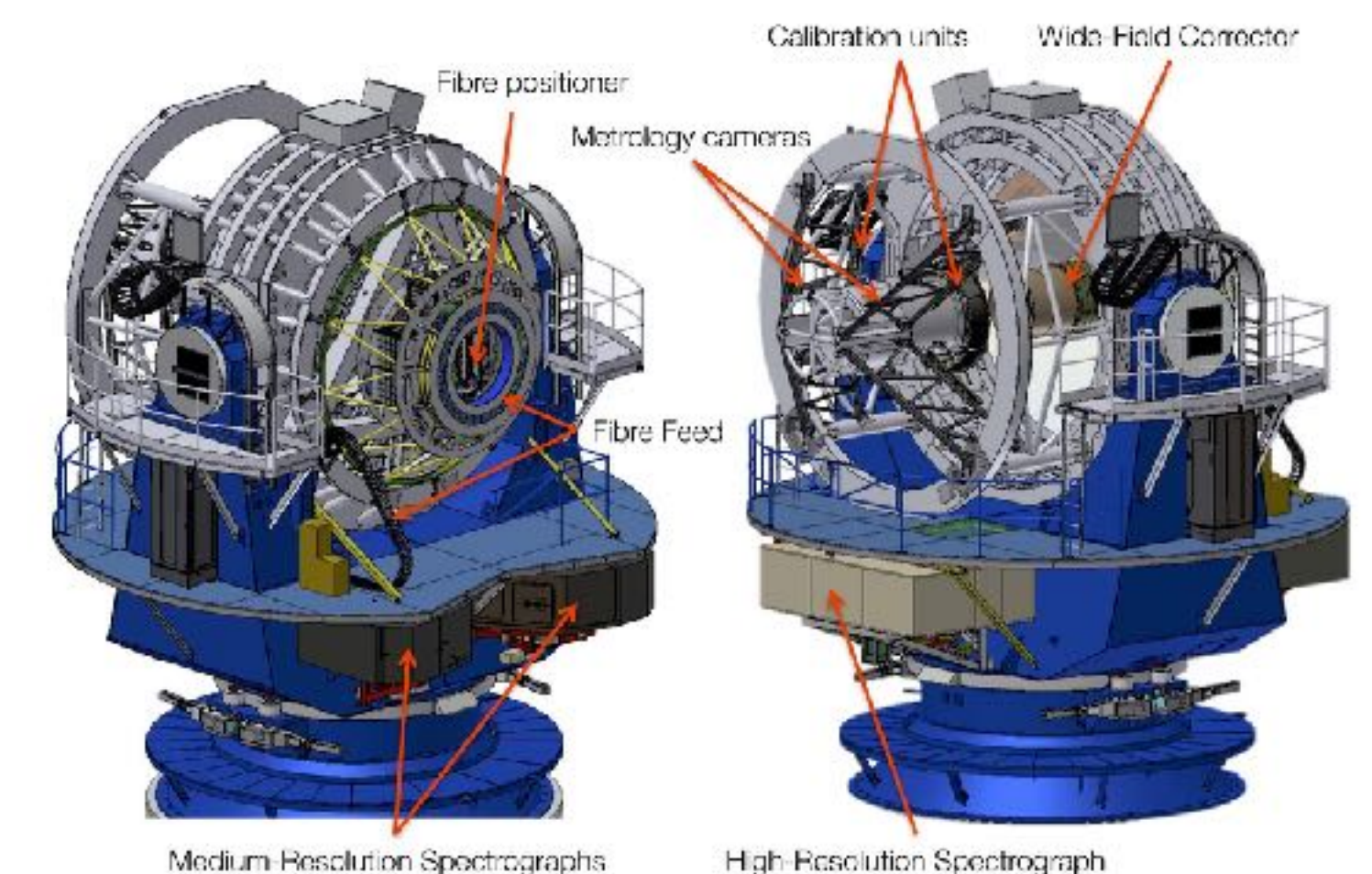
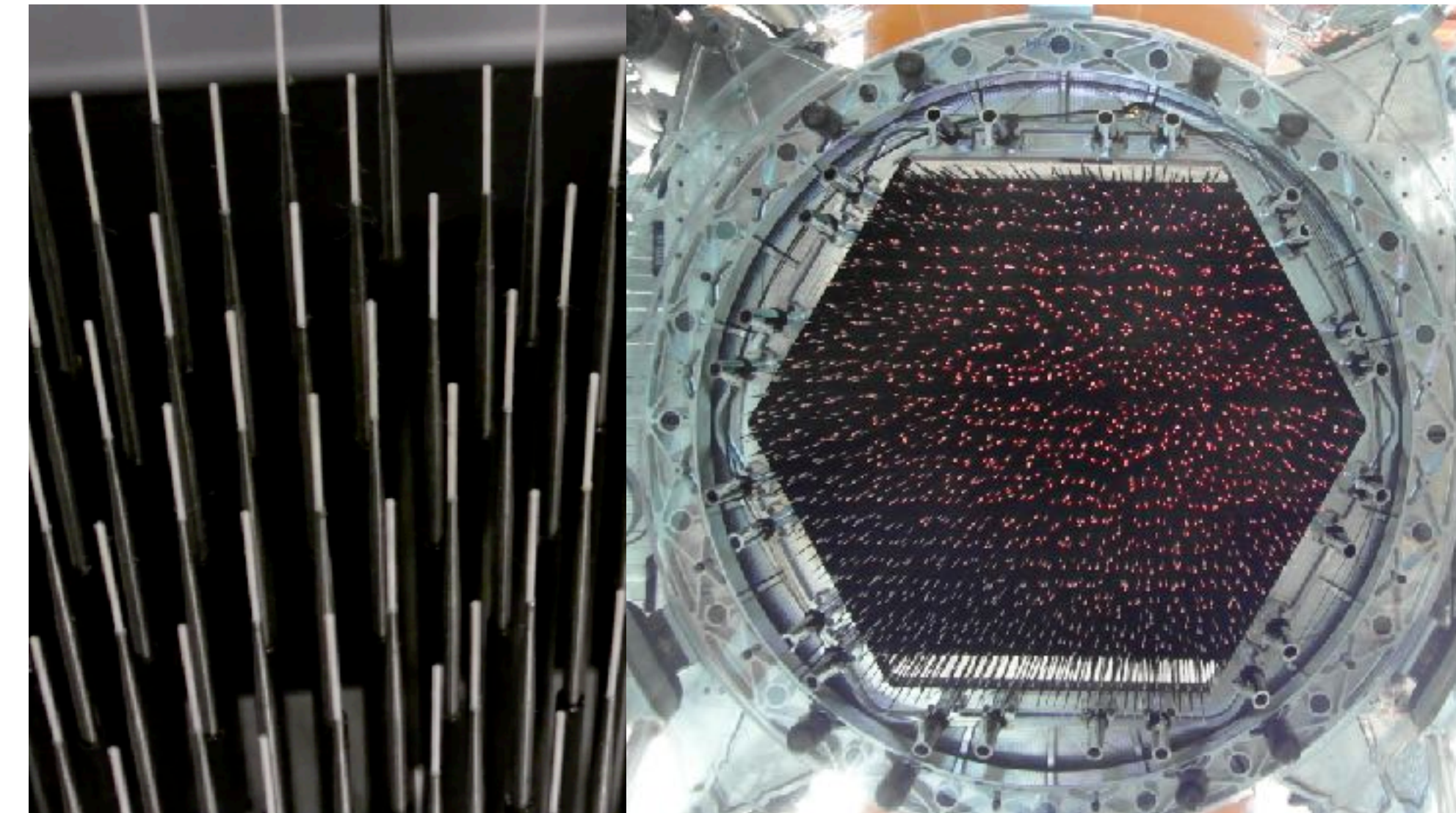


4MOST

4m Multi-Object Spectroscopic Telescope

- Fibre-fed spectroscopic survey
 - ~2,400 fibres
- Mounted on VISTA telescope
- 4 square degrees
- 10 consortium surveys (galactic and extra-galactic focus)
 - Community surveys too
- 5 year survey covering entire southern sky at least twice
 - ~25 million spectra in total

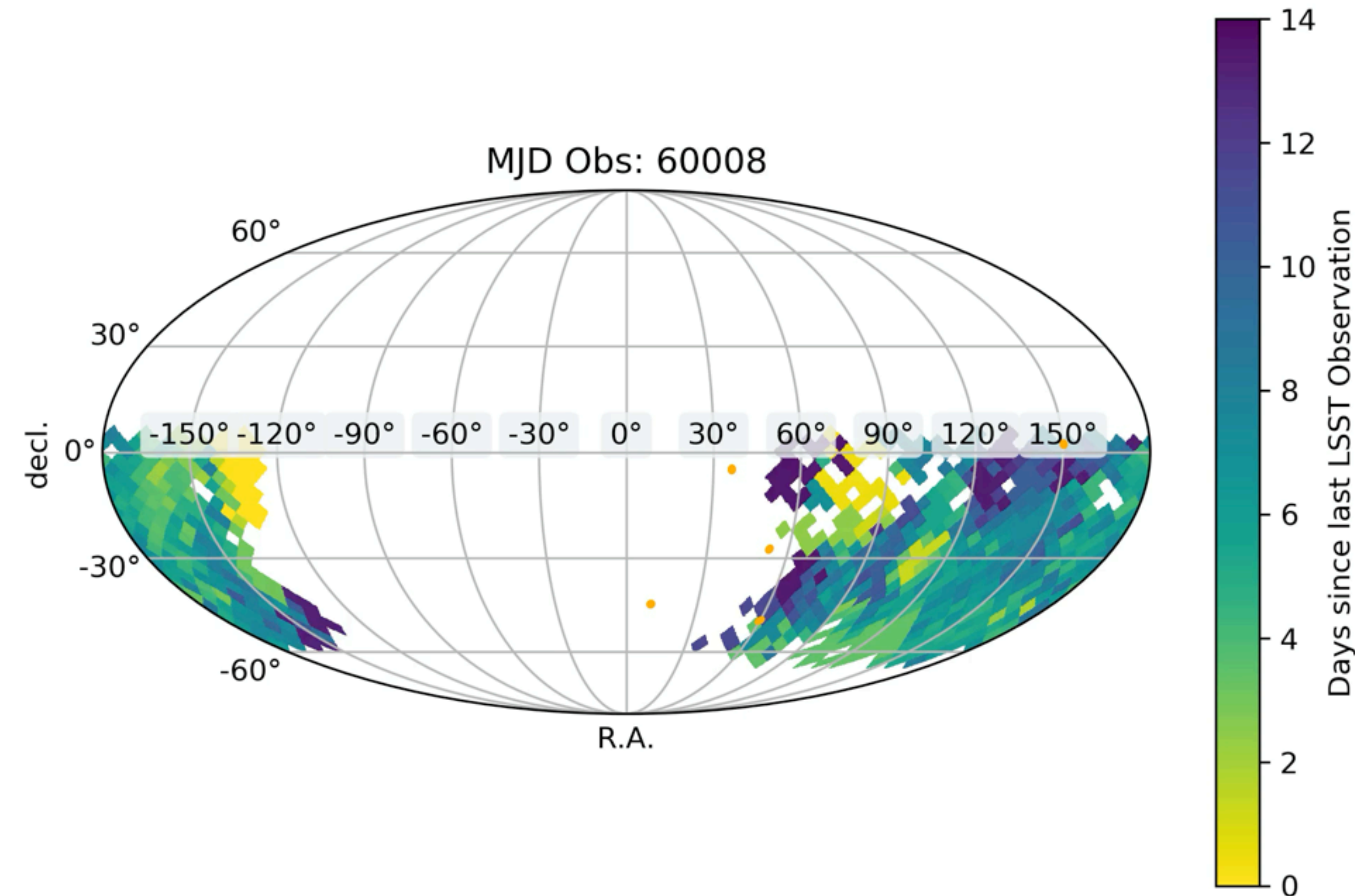
TIDES: 250,000 fibre hours for time-domain science



TiDES on the sky

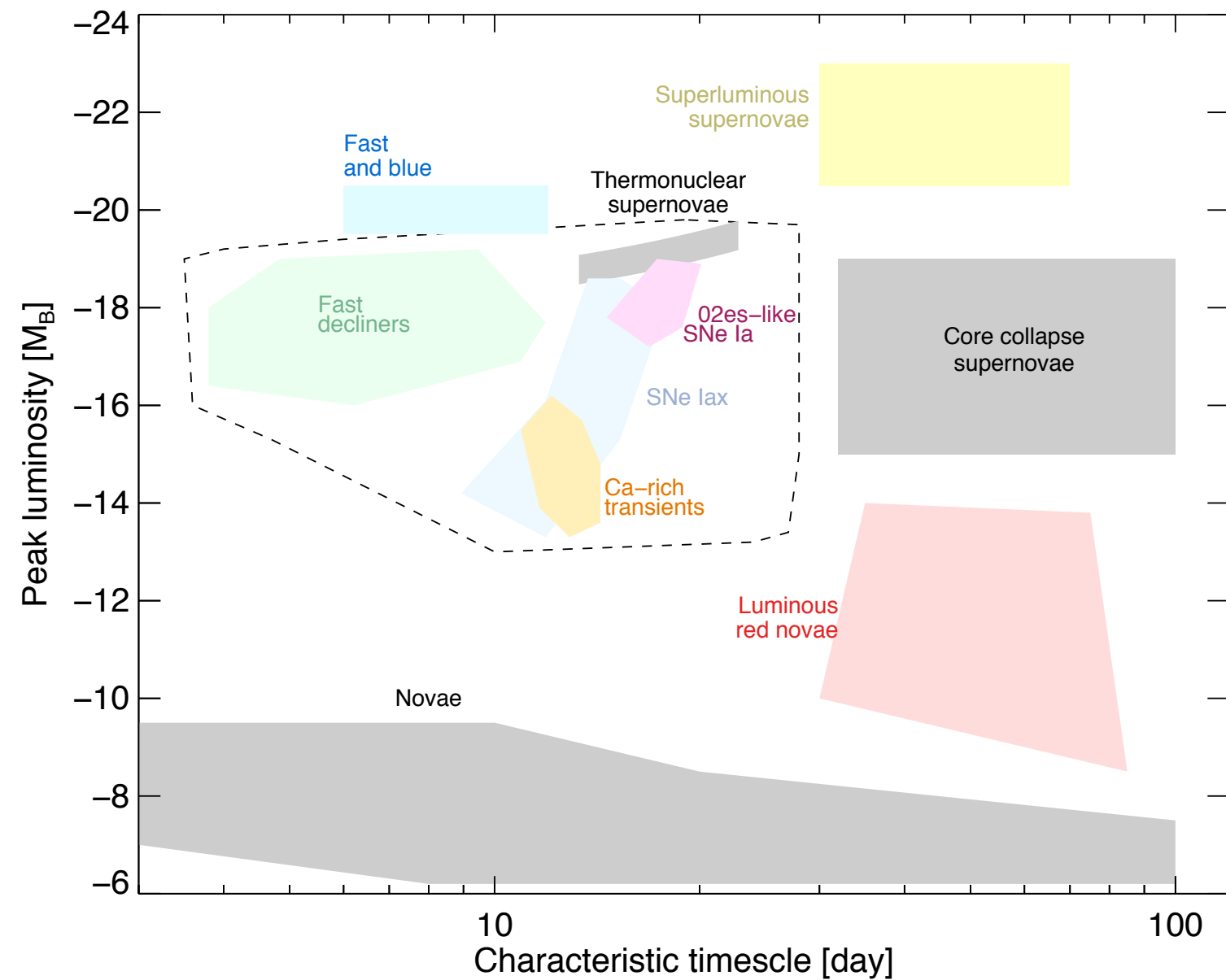
Mopping-up transients found by LSST

- TiDES does not dictate 4MOST strategy
- Piggy-back survey
- Catches the chance encounters of SNe recently discovered by LSST



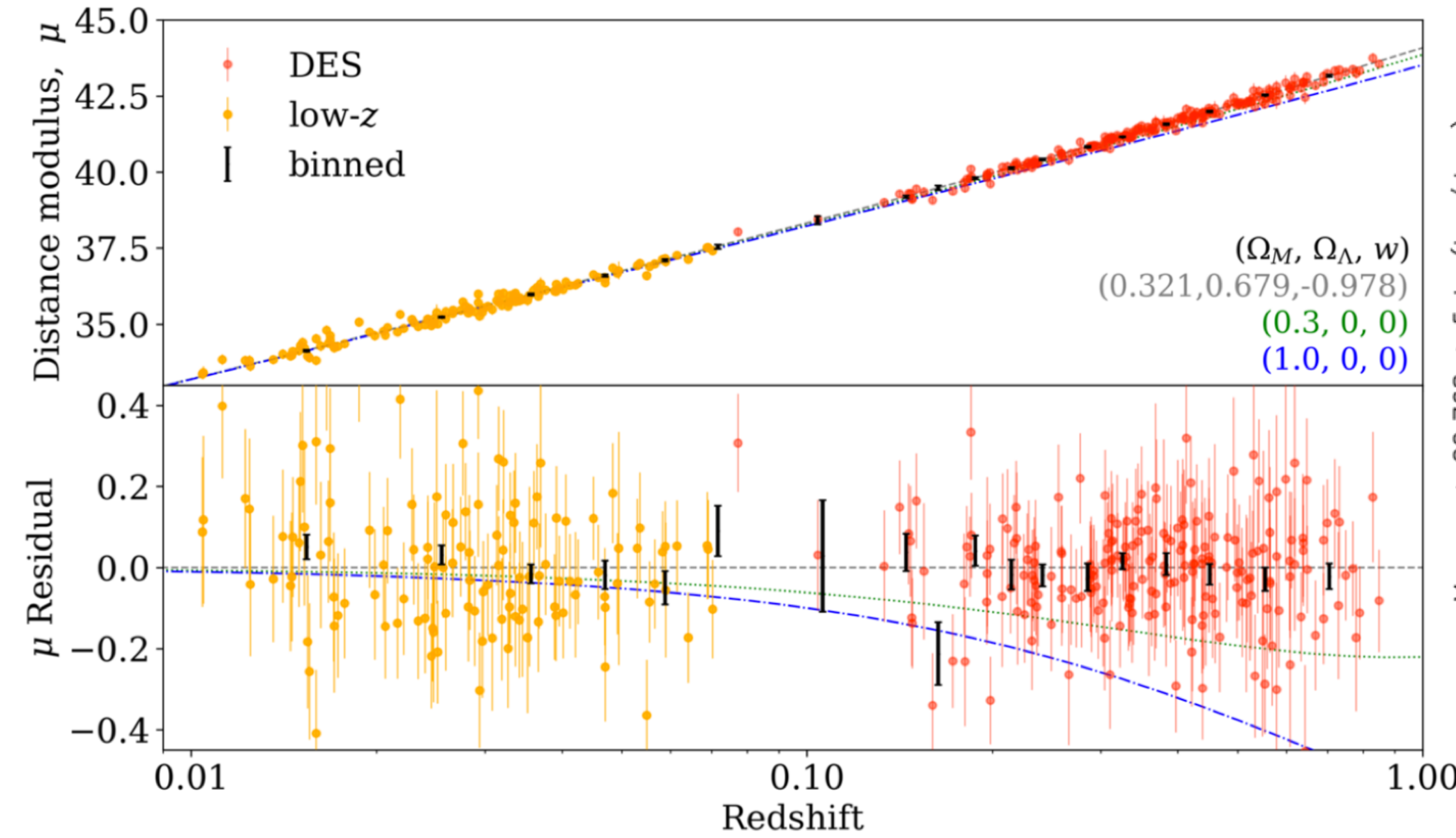
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Map the diversity of the transient universe



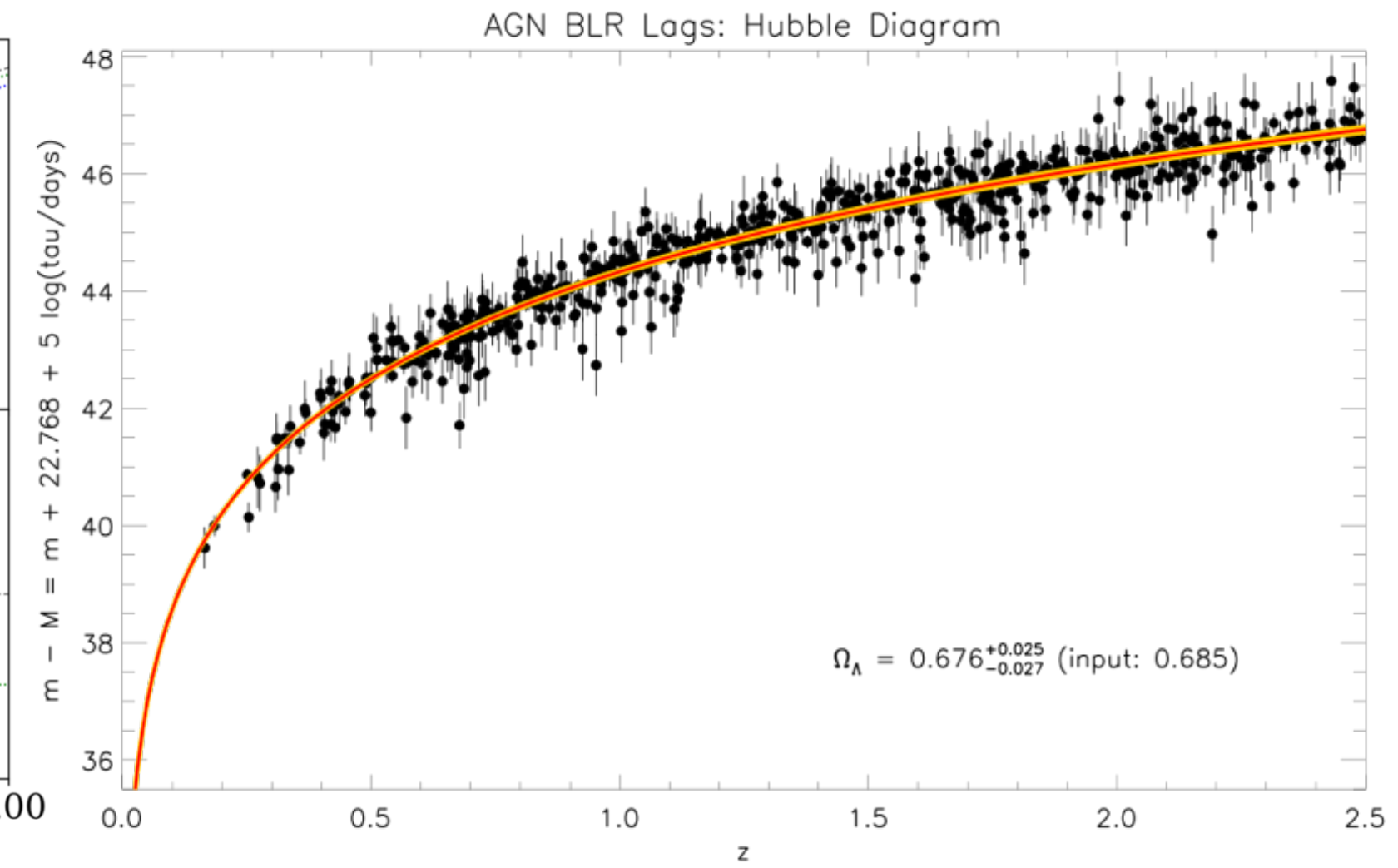
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Dark Energy with SNe Ia



3

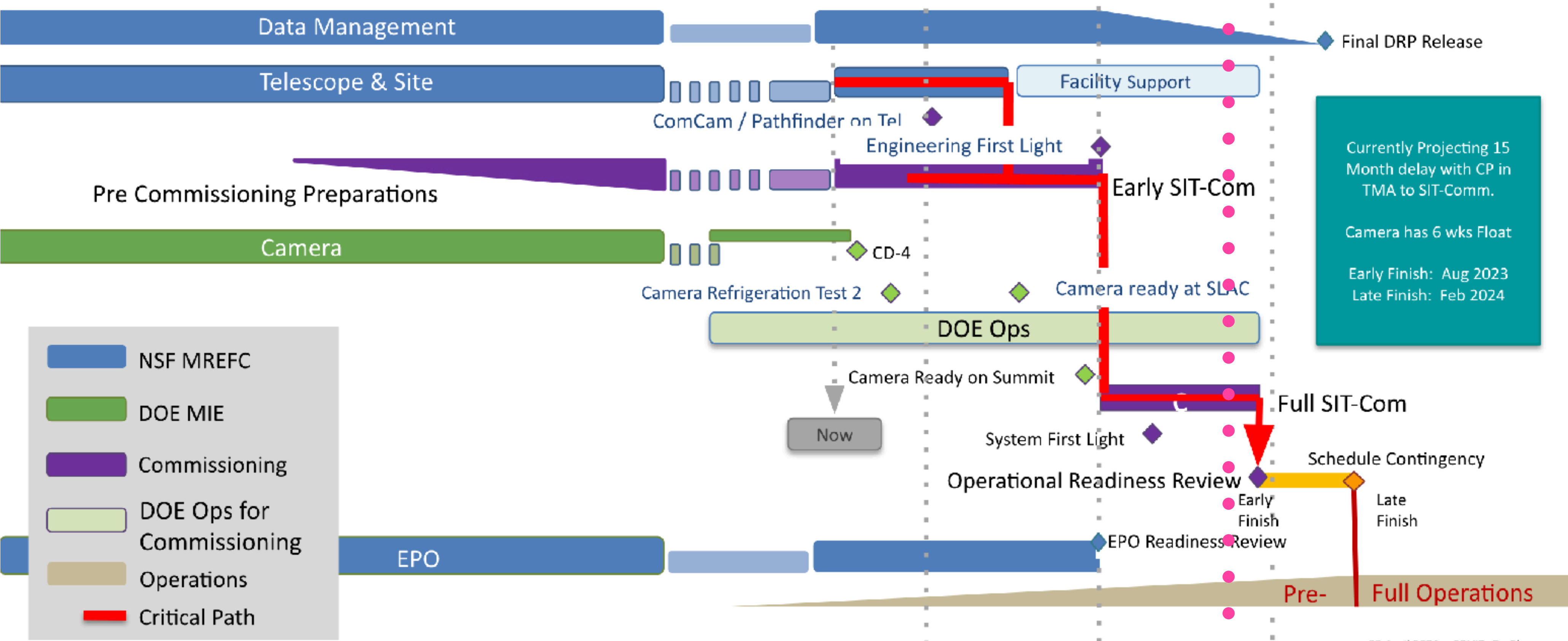
AGN Reverberation Mapping



Timeline

4MOST start date*

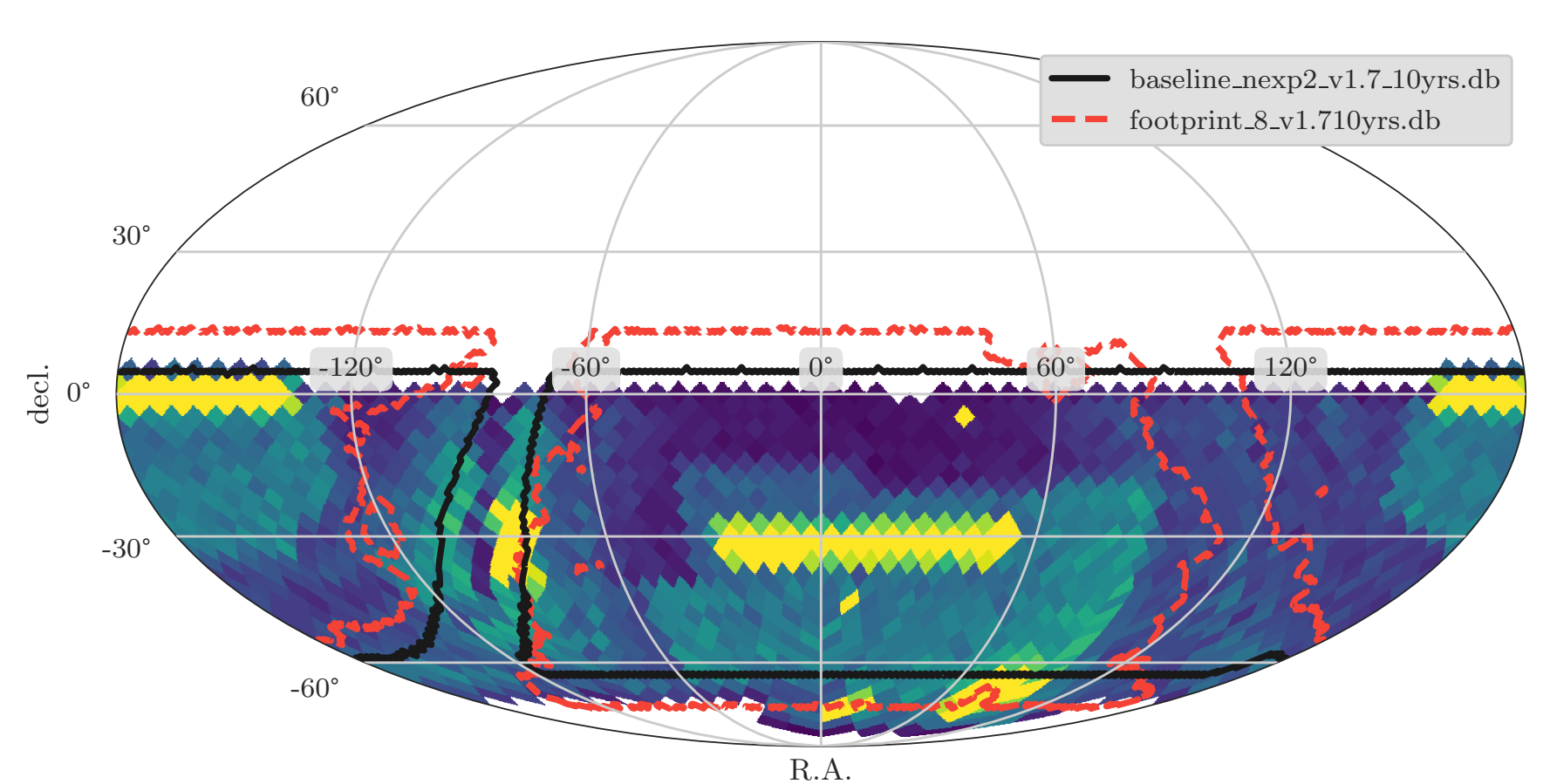
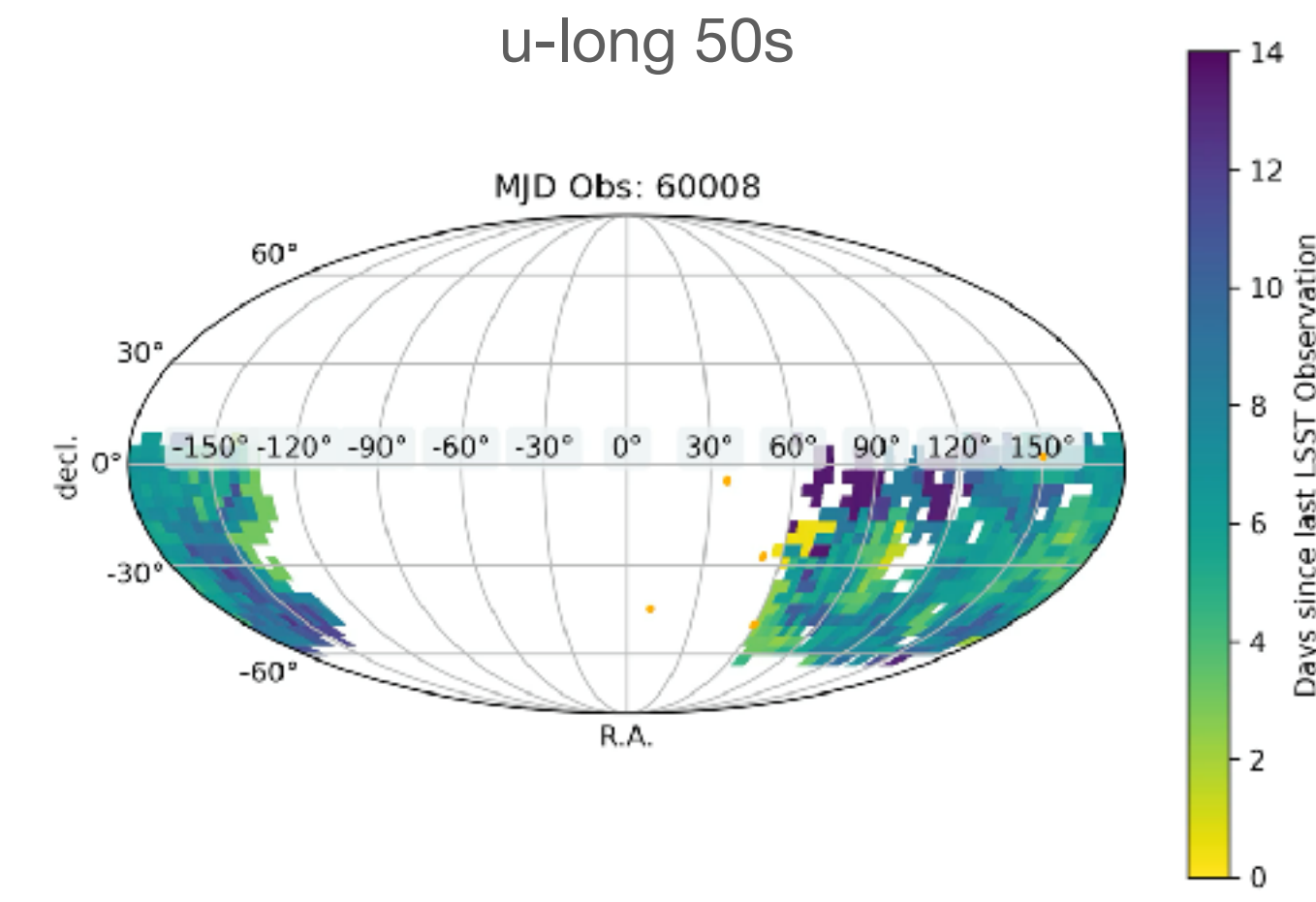
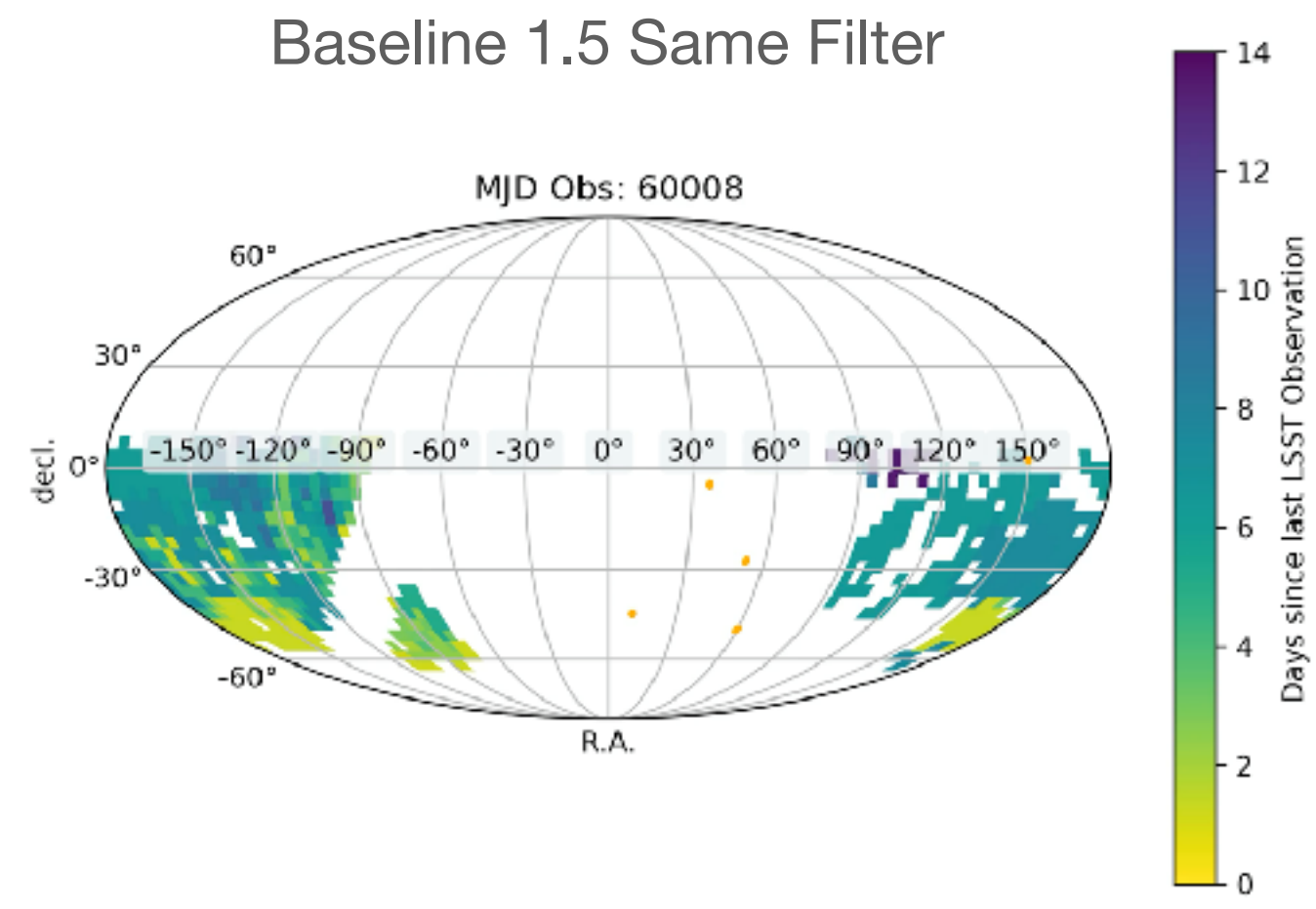
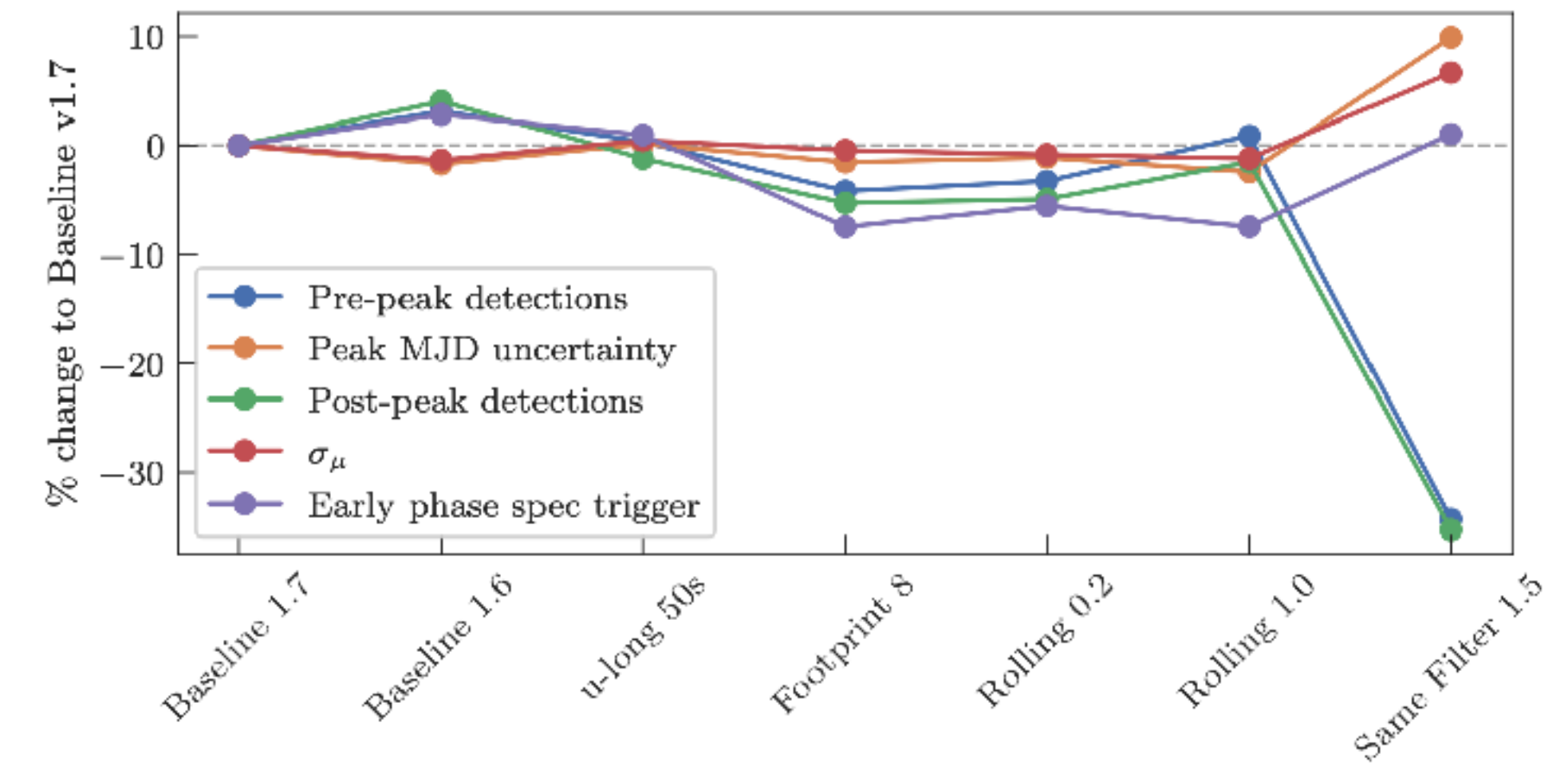
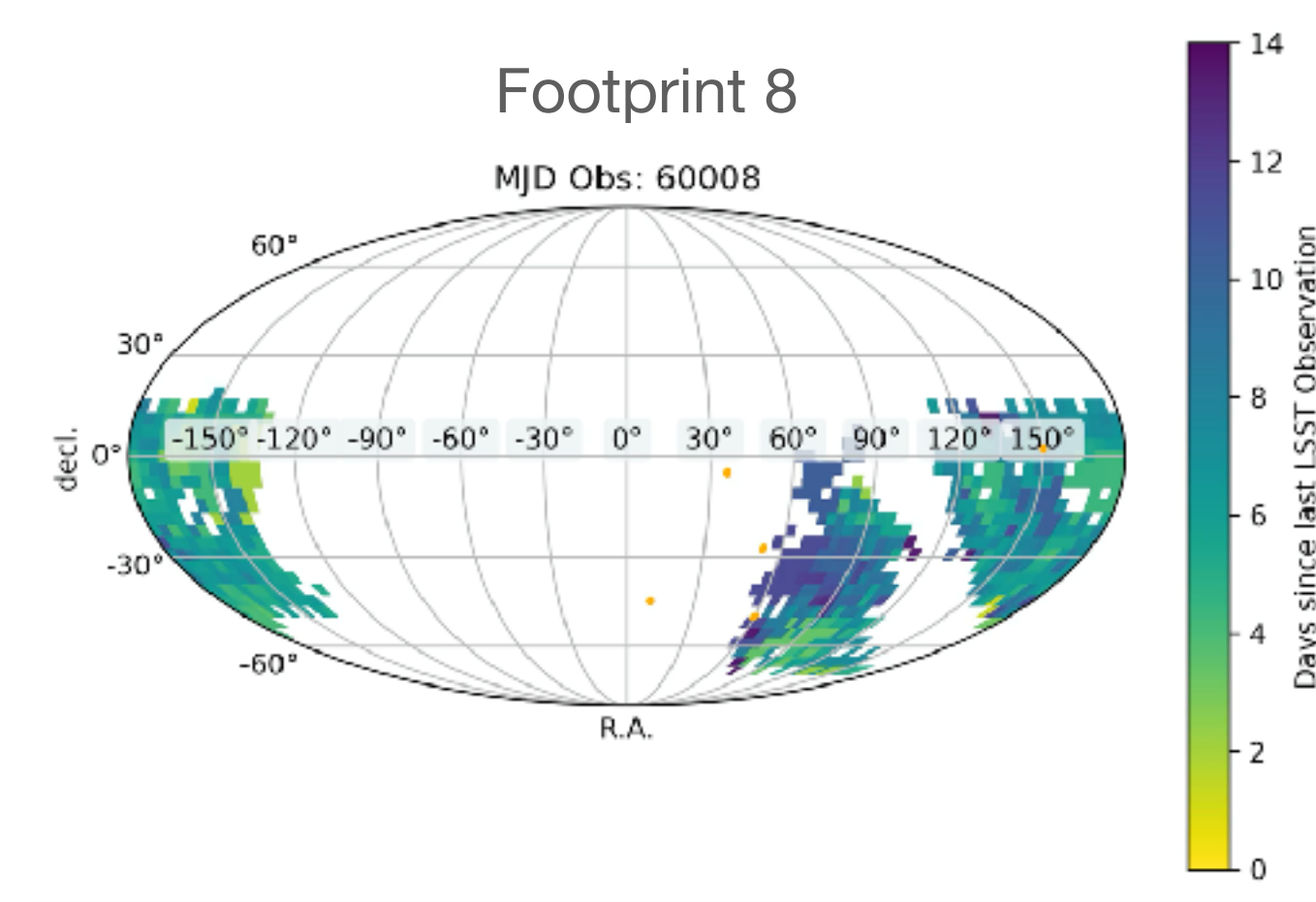
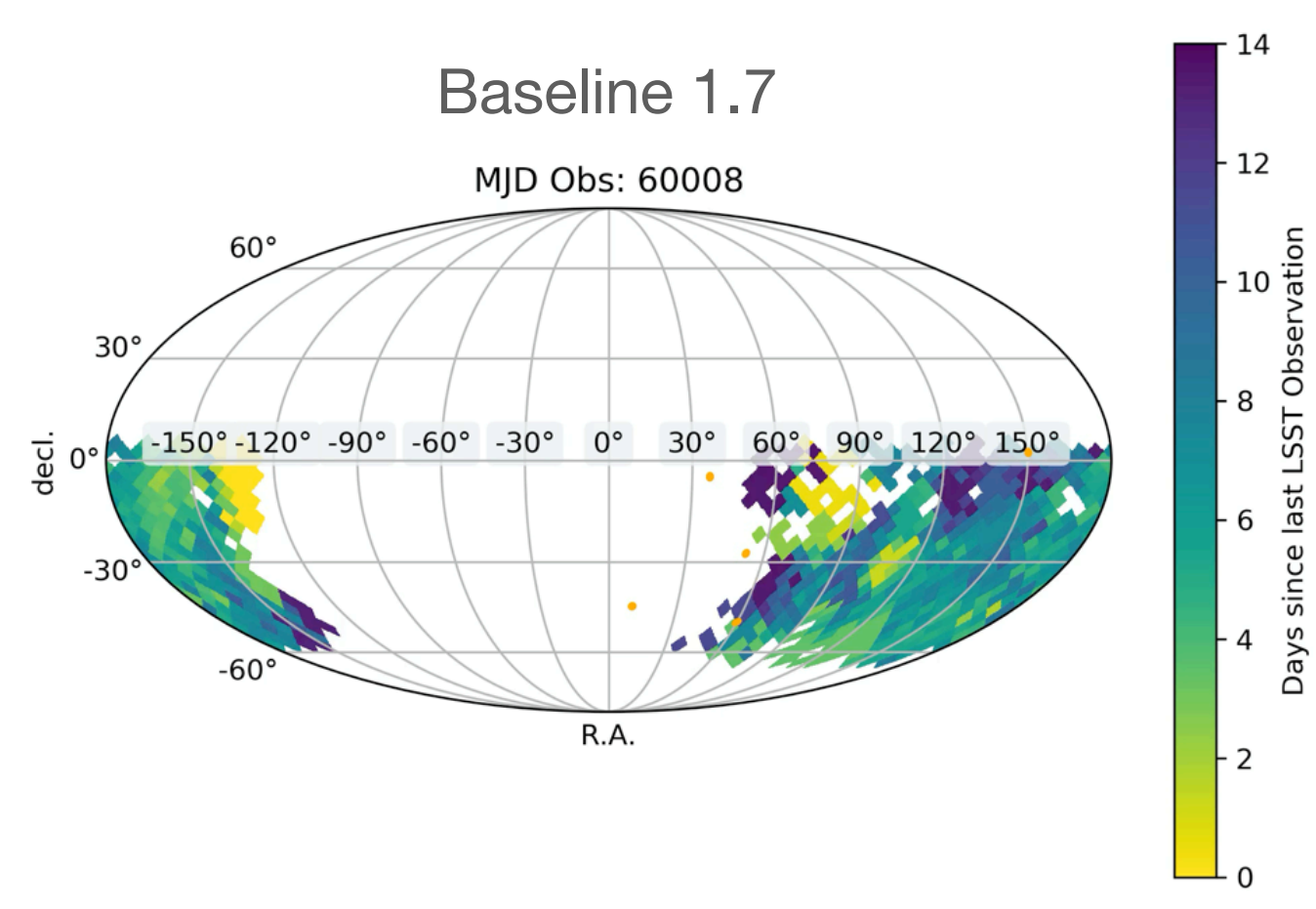
	CY2017				CY2018				CY2019				CY2020				CY2021				CY2022				CY2023				CY2024										
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
FY2017				FY2018				FY2019				FY2020				FY2021				FY2022				FY2023				FY2024											
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

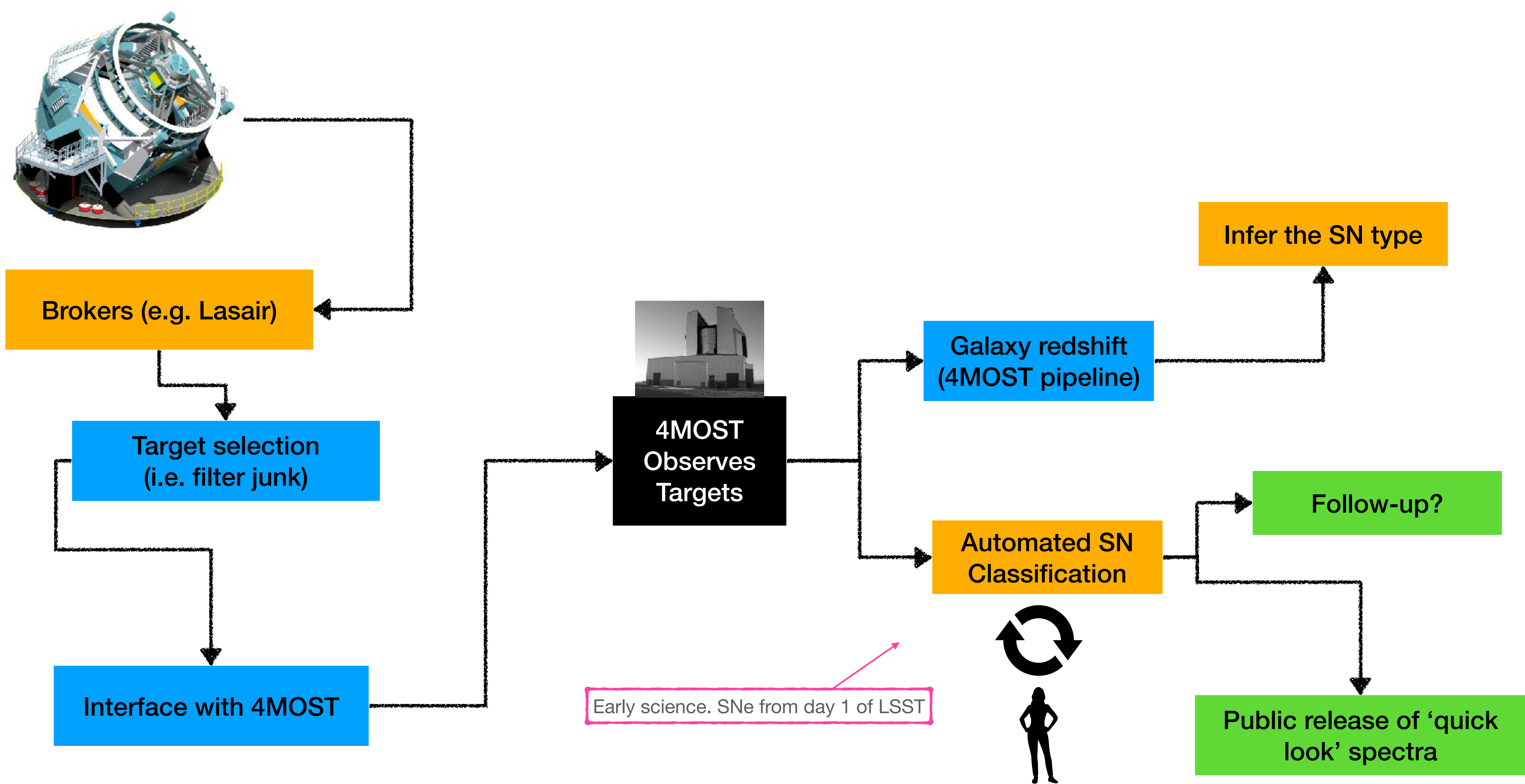


*expect some more slippage on dates

TIDES preparation work

Lots to be done!





Community involvement

Before and during 4MOST operations

Brokers (e.g. Lasair)

- Currently plan to use Lasair to feed 4MOST.
- Open to any broker providing targets.
- Niche cases for certain transient types?

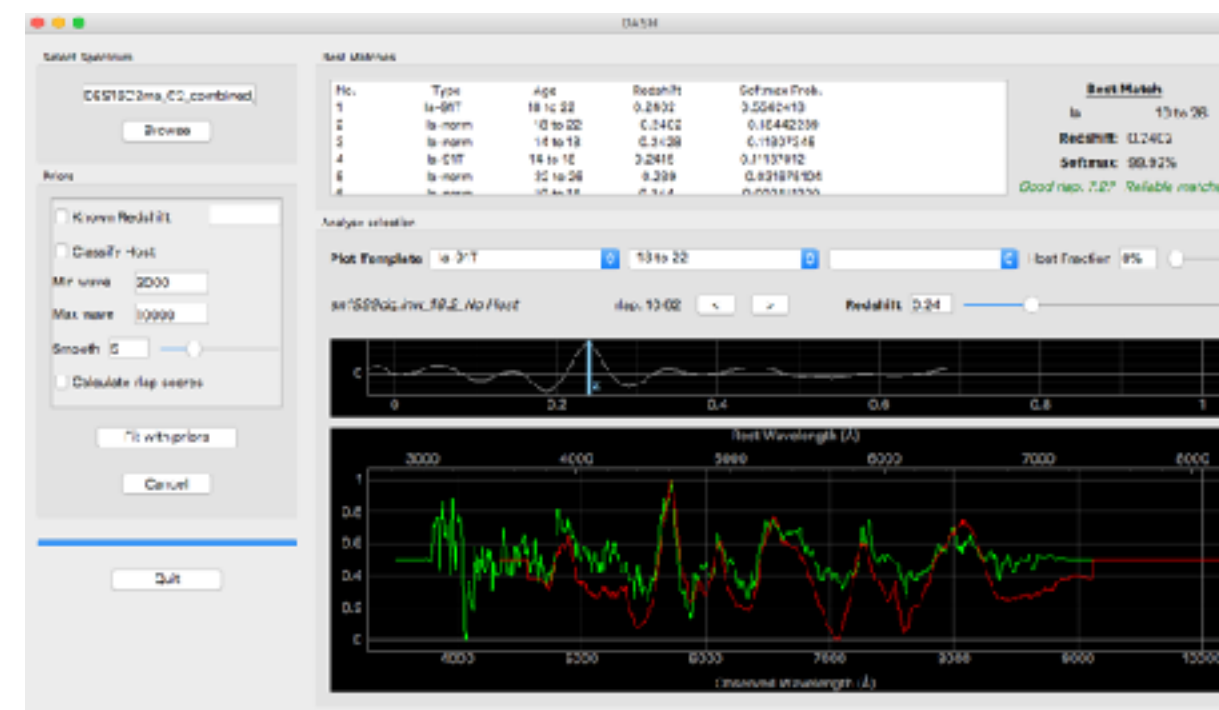
Automated SN Classification

- Public release of “quick” SN spectra.
- Automated classification from DASH (Muthukrishna et al., 2019)
- Human intervention to check

Infer the SN type

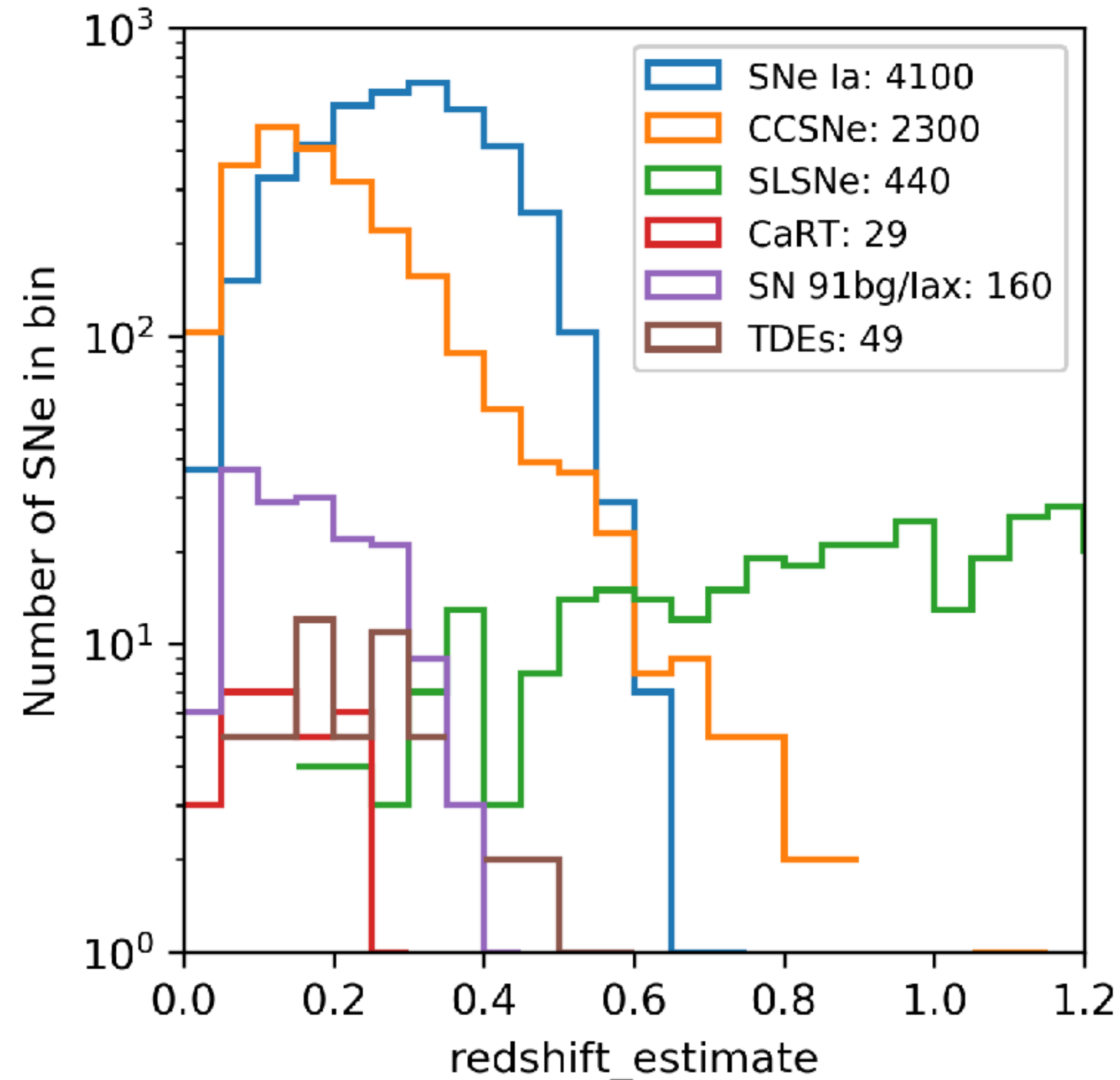
- Galaxy redshifts greatly improve the photometric classification of supernovae.
- SNN is the standard in e.g. DES.
- Will it be the standard in the LSST-era?

LASAIR



Early TiDES

1 year of operations

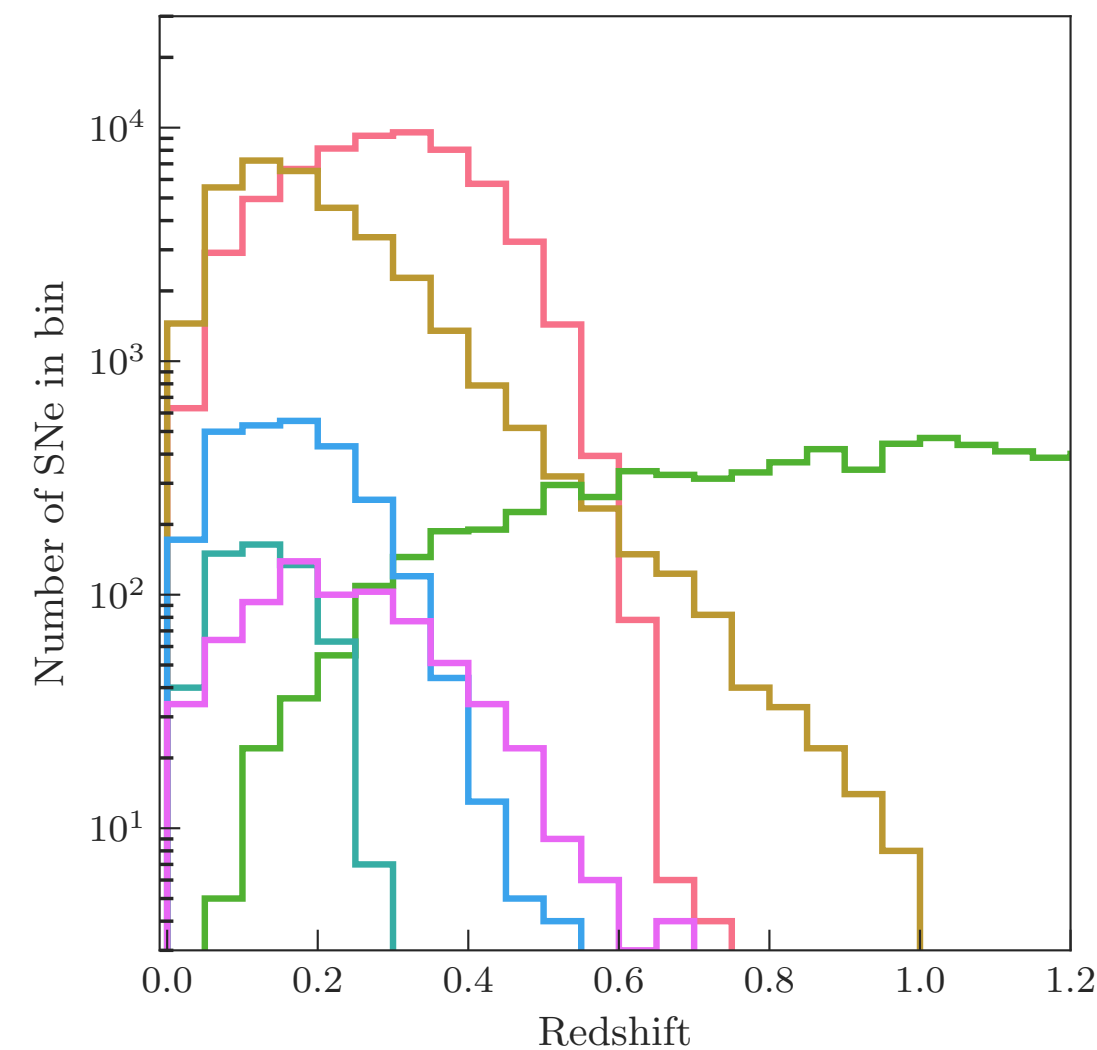


**~10x DES 3yr in 1
year of TiDES!**

TiDES Science overview after 5 years

1

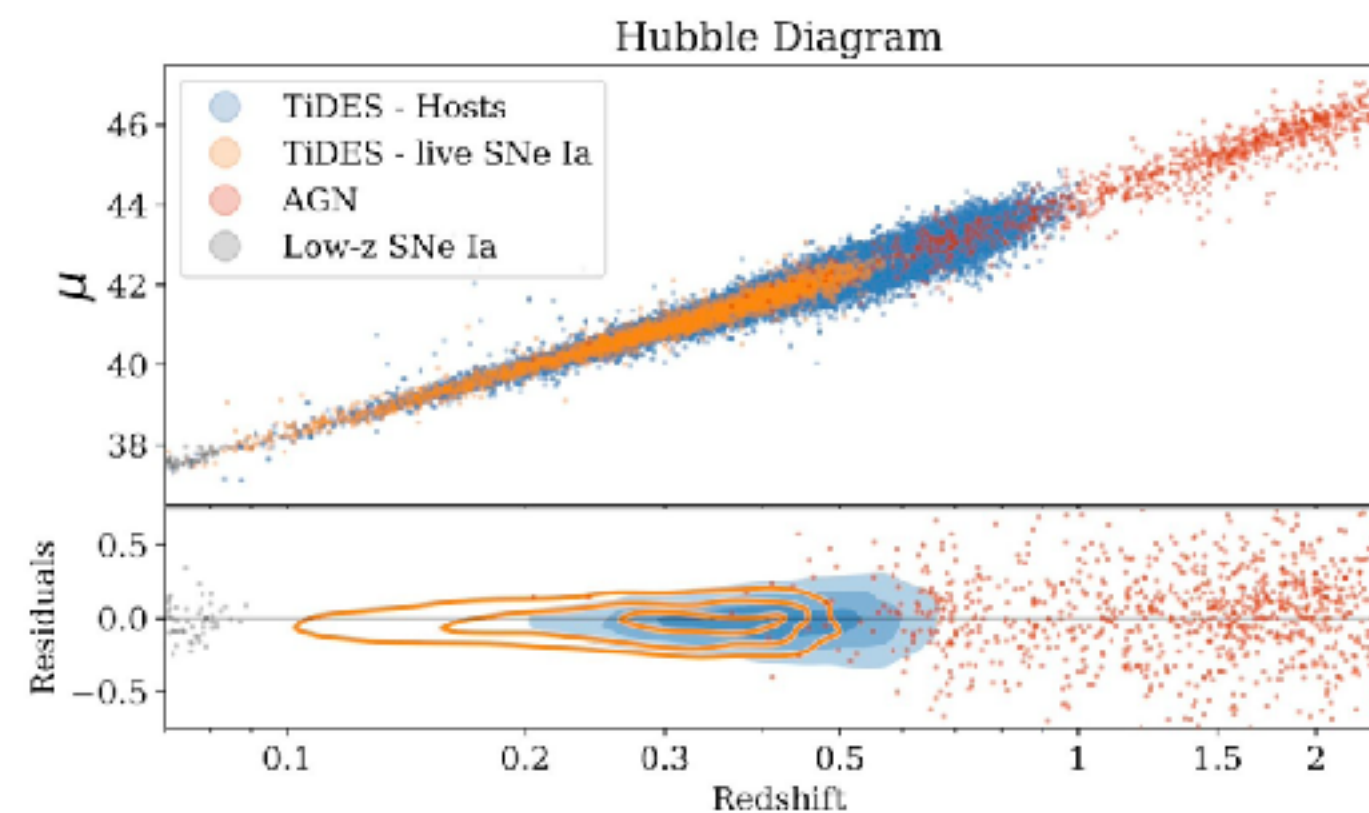
Map the diversity of the transient universe



>40,000 transient spectra

2

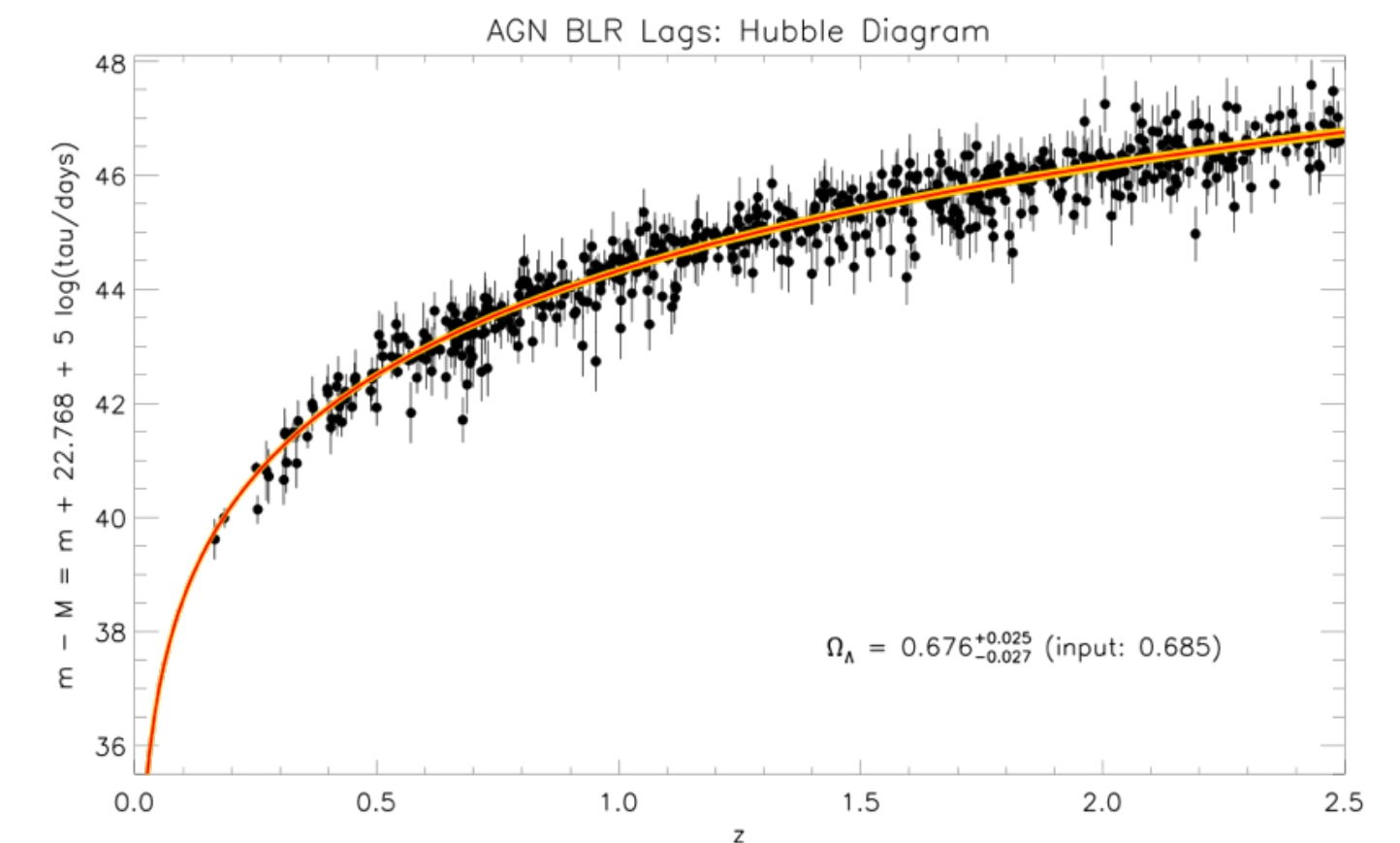
Dark Energy with SNe Ia



~70,000 redshifts

3

AGN Reverberation Mapping



~700 AGN to $z = 2.5$

Summary

- TiDES will be the largest spectroscopic follow-up survey of LSST transients
- Survey strategies not finalised, need community influence for transients
- TiDES relies on community tools for:
 - Target selection (brokers)
 - Object classification:
 - Live spectra
 - Photometric classification using host-galaxy redshifts.

