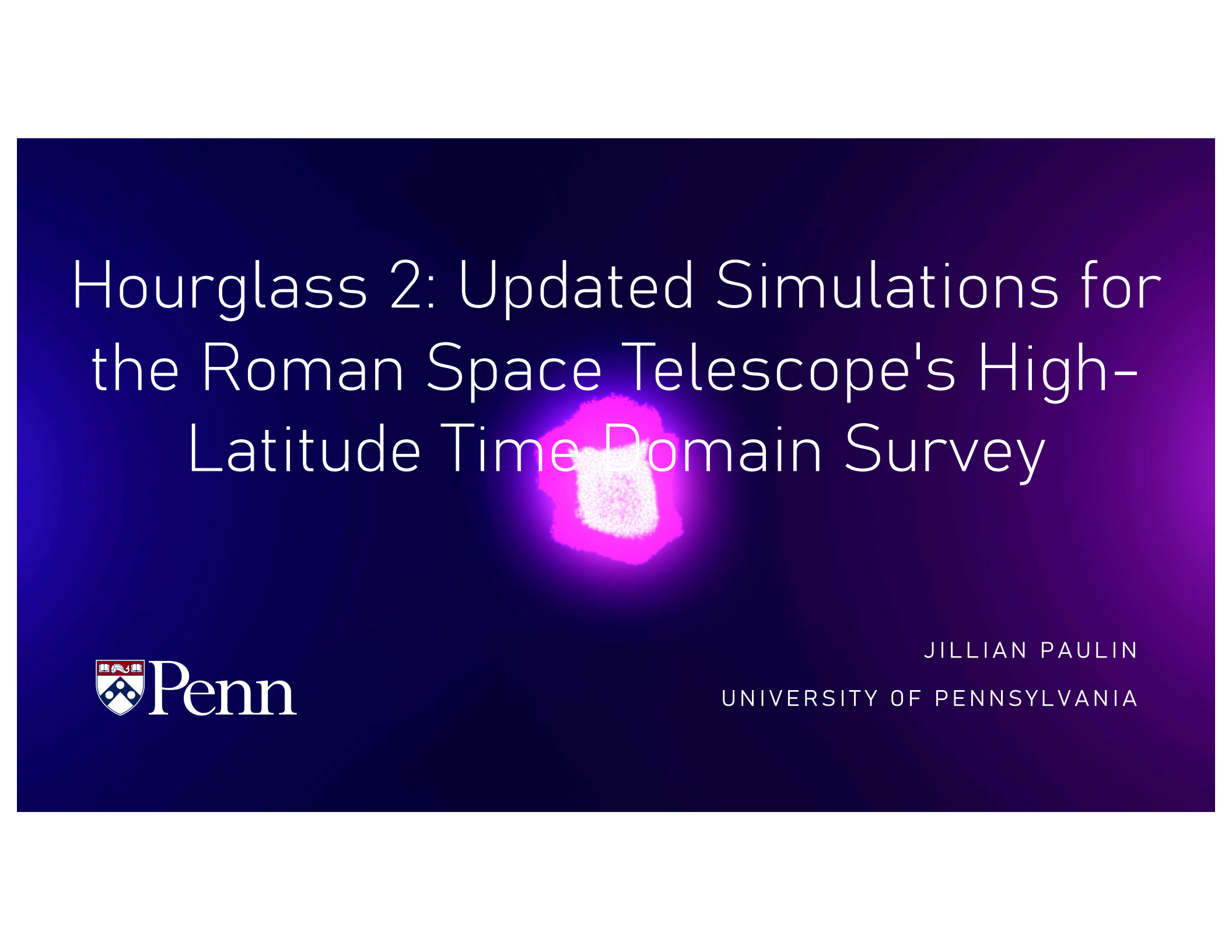
# Hourglass 2: Updated Simulations for the Roman Space Telescope's High-Latitude Time Domain Survey



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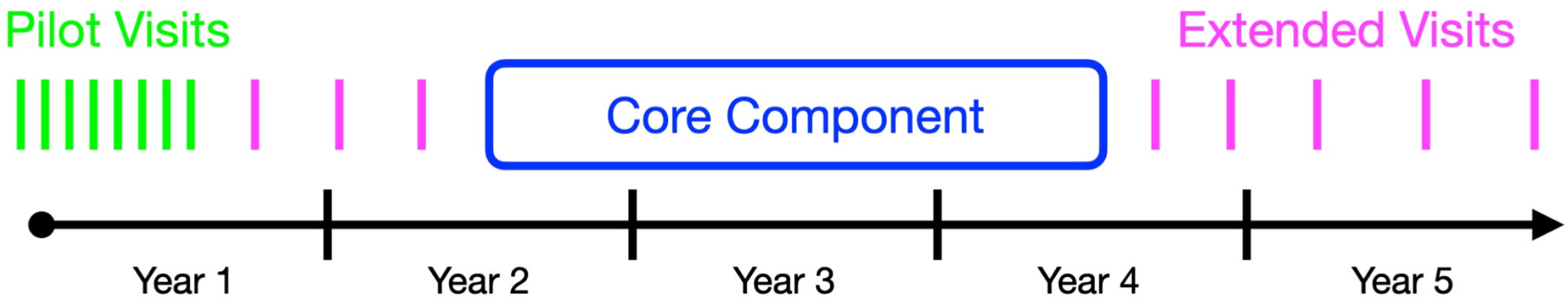
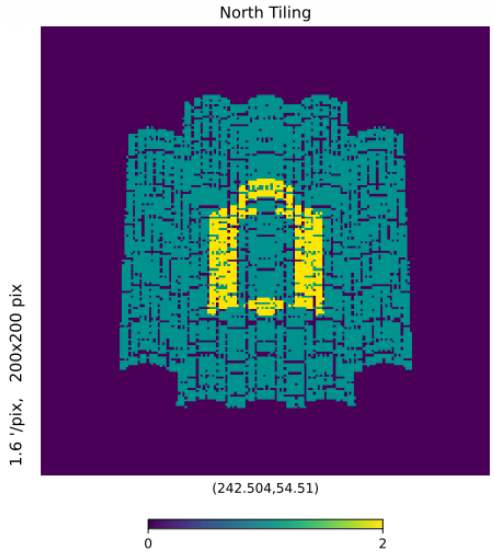
# Introduction

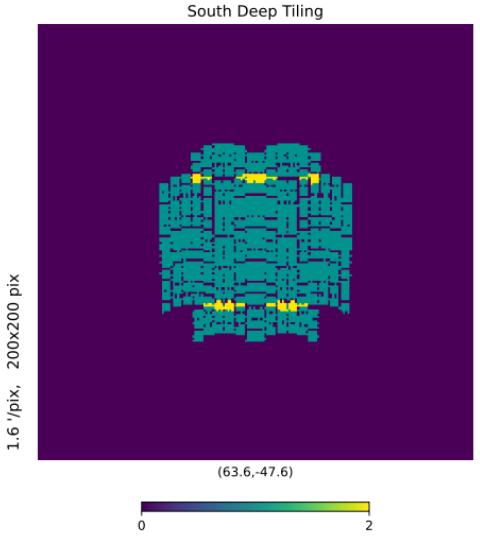
- Hourglass 2 is a collection of updated simulations of data to be collected during the Roman High Latitude Time Domain survey (HLTDS), reflecting updated observation plans as per the HLTDS Committee Report.
  - Follow-up to Hourglass by Rose et al 2025
- We simulate several transients, including Type Ia Supernovae (SNIa), Core-Collapse Supernovae (CCSN), and rare transients (PISN, ILOT, KN, TDE, SLSN, SNIax, SNIa-91bg)
- We also provide light curve fitting analysis using SALT3 (Kenworthy et al 2021)
- We also provide classification training/ testing with SCONE (Qu et al 2021)
- SNANA (Kesser et al 2009) with PIPPIN wrapper (Hinton & Brout 2020)

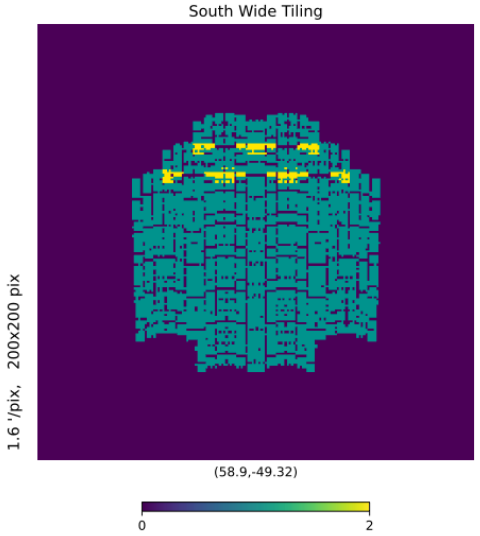
# Survey Design



# Survey Design



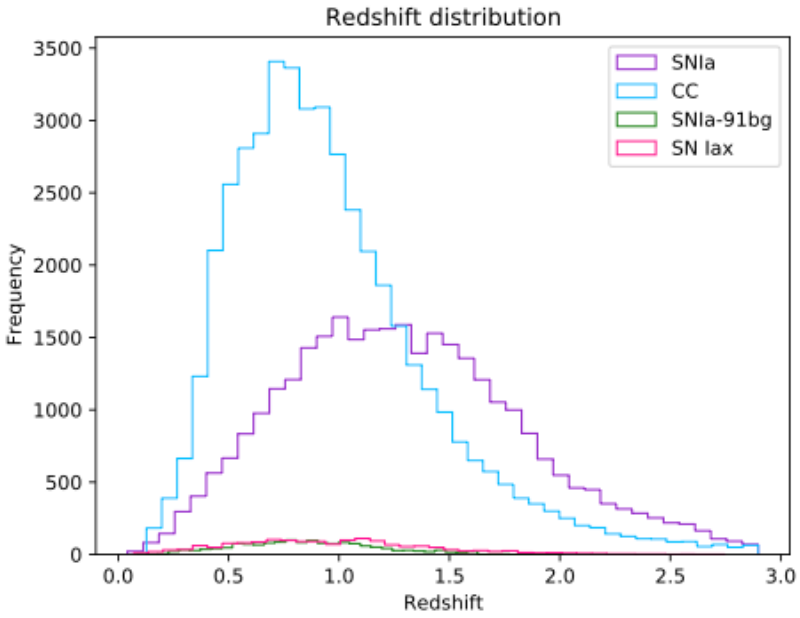
# Survey Design

- Wide tier
  - Capture more transients, with filters F062, F087, F106, F129, F158
- Deep tier
  - Capture transients at higher redshifts, with longer exposure times, with filters F087, F106, F129, F158, F184
  - Spectra are taken in the South Deep field only
    - Spectra also have Wide/ Deep tiers

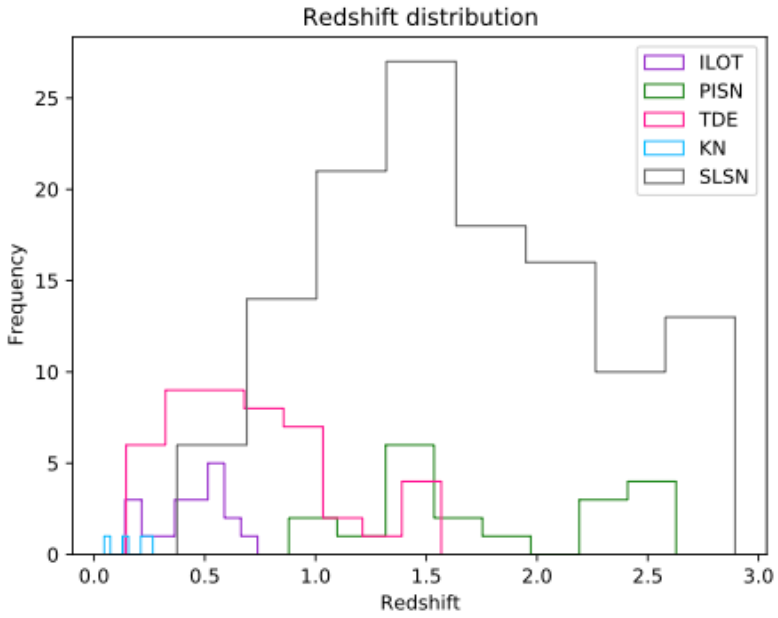
# Simulations

| Transient | Pilot | Extended | Core | Total |
|---|---|---|---|---|
| SNIa | 2587 | 5062 | 23462 | 31111 |
| CCSN | 3016 | 7623 | 34326 | 44965 |
| SNIa-91bg | 113 | 122 | 1299 | 1534 |
| SNIax | 128 | 239 | 1274 | 1641 |
| AGN | 181 | 1 | 1 | 183 |
| ILOT | 3 | 2 | 14 | 19 |
| KN | 0 | 1 | 3 | 4 |
| PISN | 6 | 6 | 7 | 19 |
| SLSN | 10 | 22 | 93 | 125 |
| TDE | 3 | 9 | 34 | 46 |

# Simulations



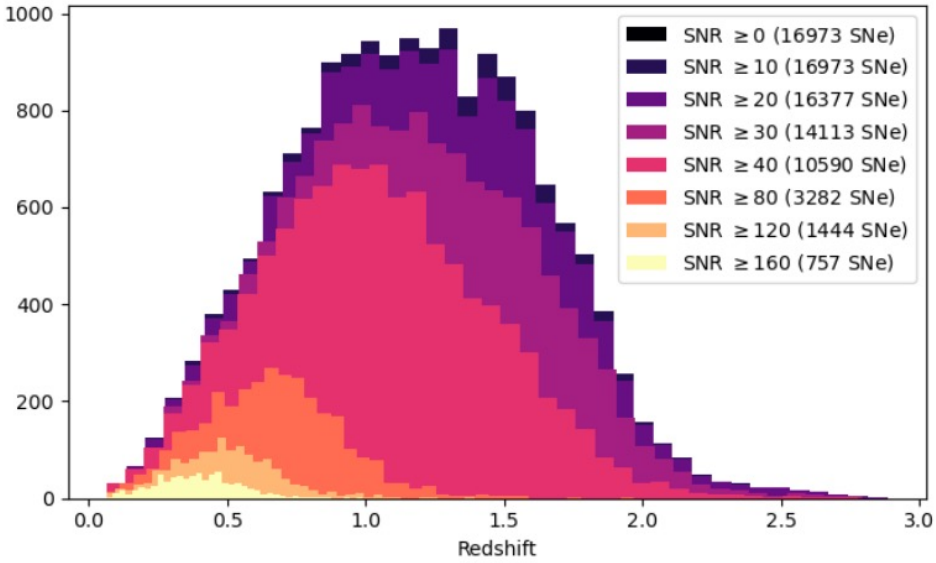

(a) SNe



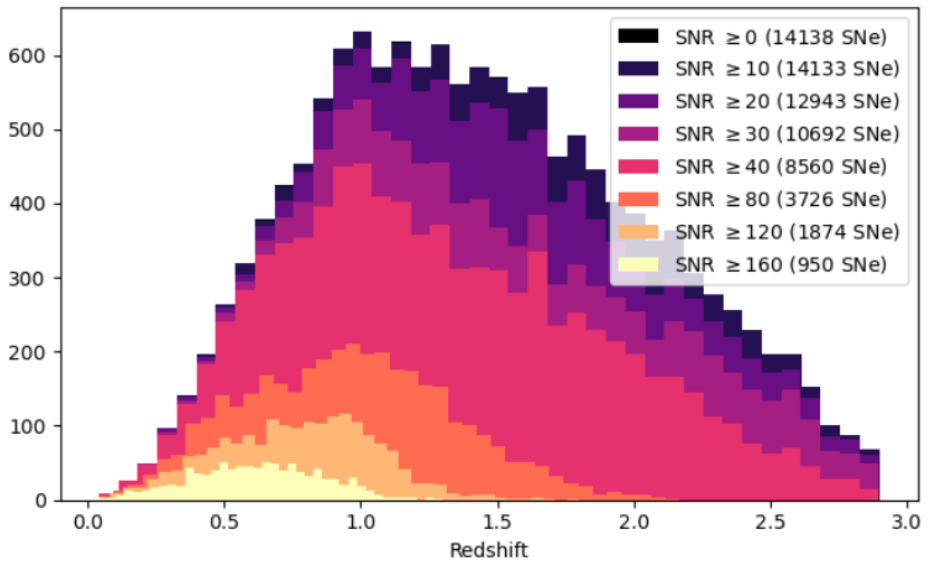

(b) Rare transients

# Zooming in on Type las

# Simulations

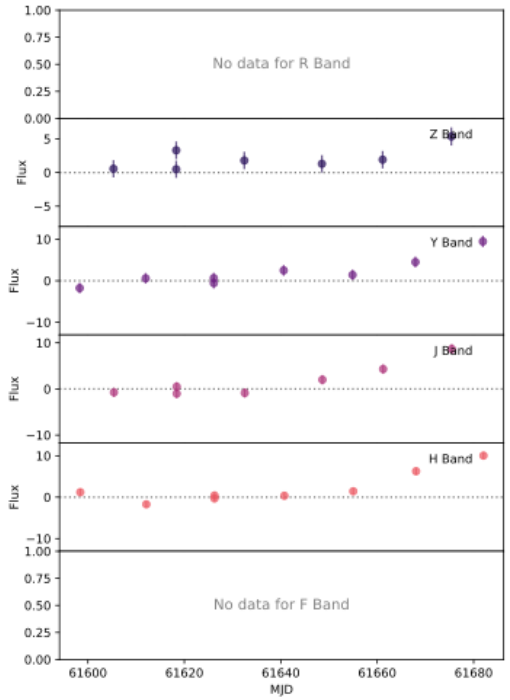



Wide Tier

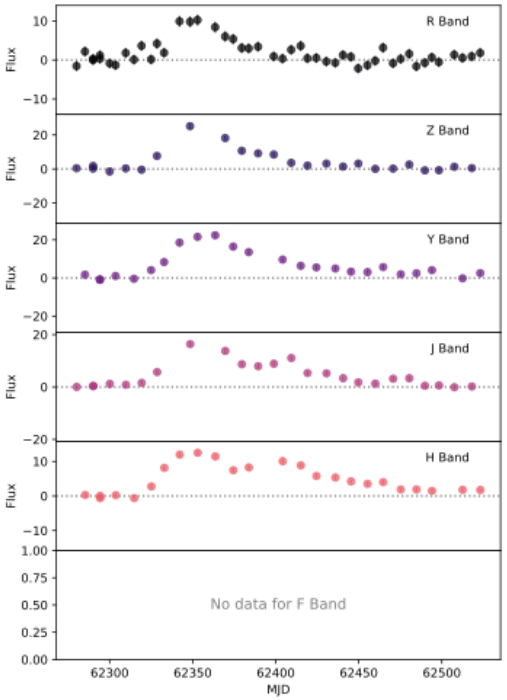



Deep Tier

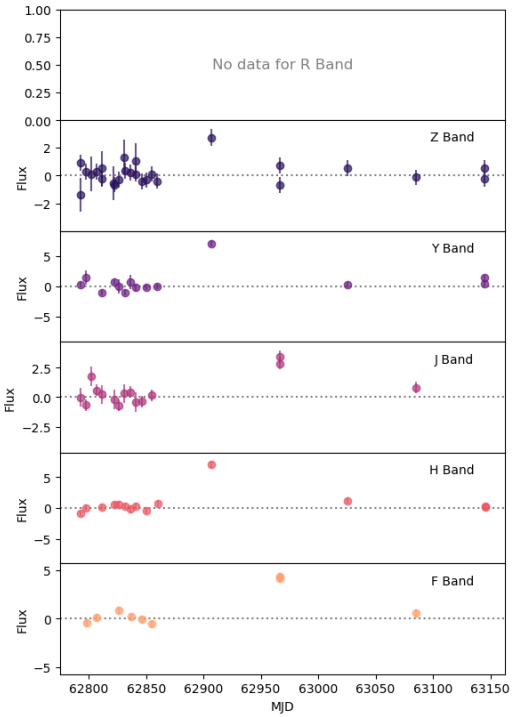
## Pilot




## Core




## Extended



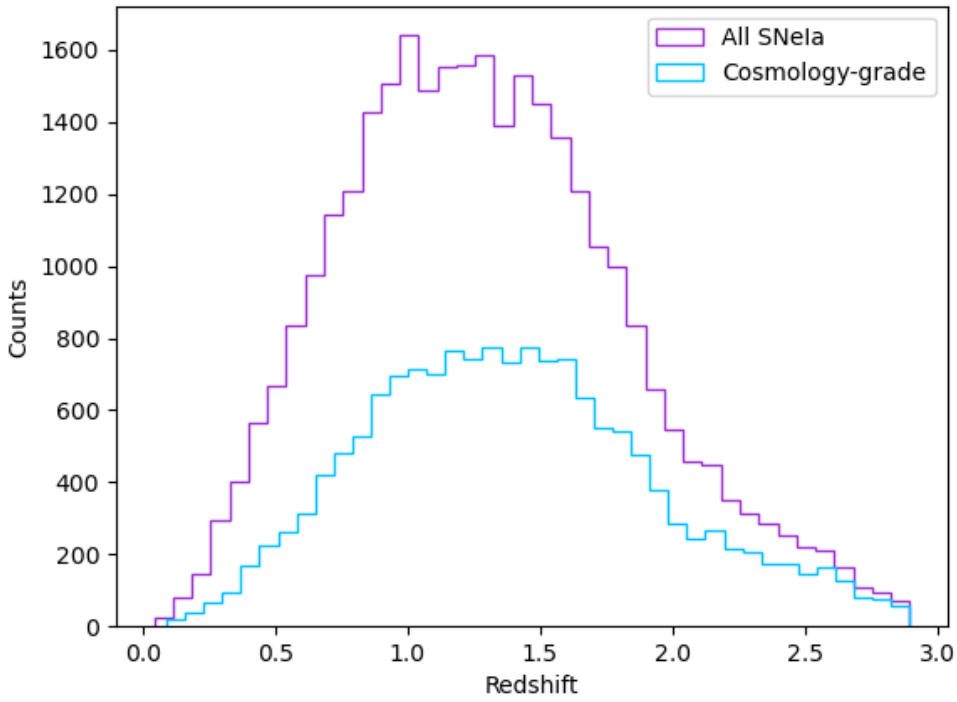
# Simulations

Cosmology-grade cuts:

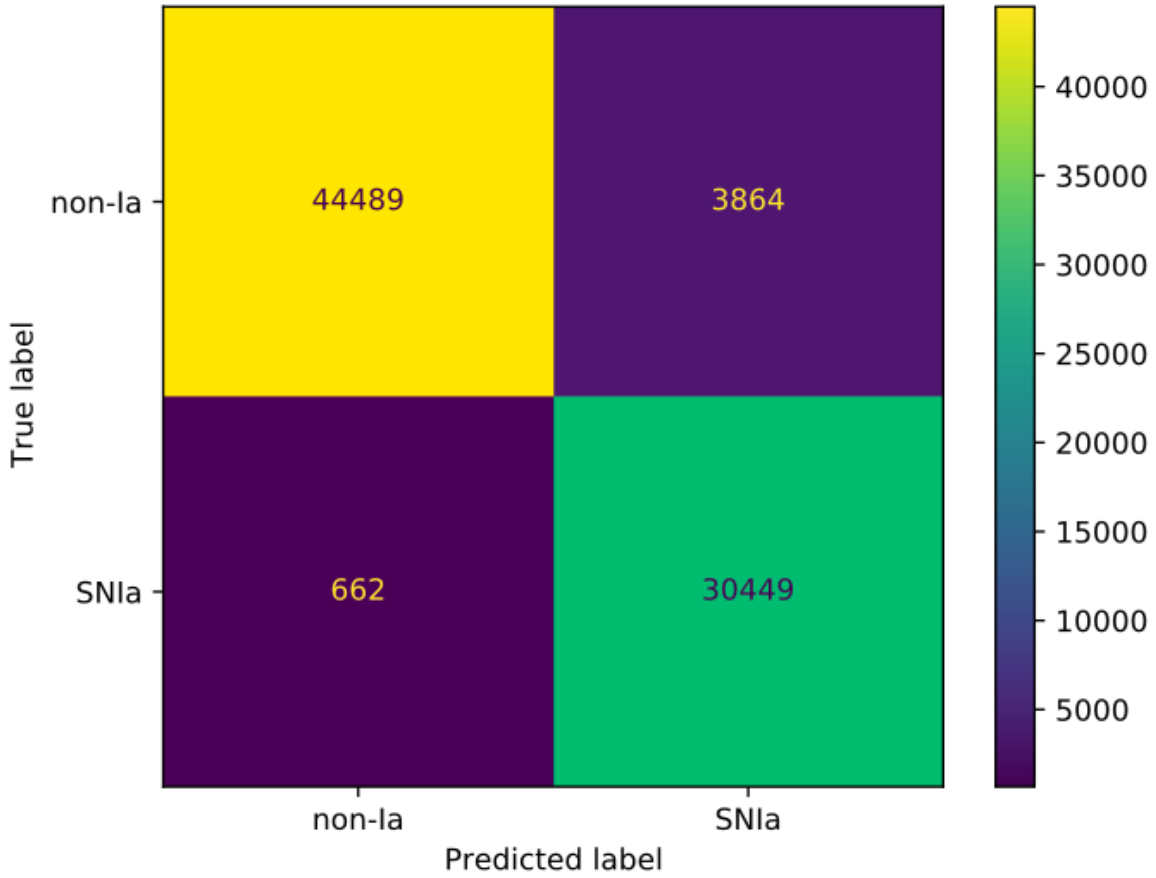
- At least one point before peak
- At least one point within 5 days of peak
- At least one point more than 2 days after peak
- At least one point 30+ days after peak

→ 31,111 SNIa before cuts

→ 15,433 SNIa after cuts



# Classification



# Conclusions

- Be on the lookout for the paper soon!!
- Hourglass 2 uses the most up-to-date survey plans/ recommendations
- Publicly available data for both las and non-las
  - Light curves and spectra
  - Use for a variety of applications
- Next steps: cosmology!

Acknowledgments

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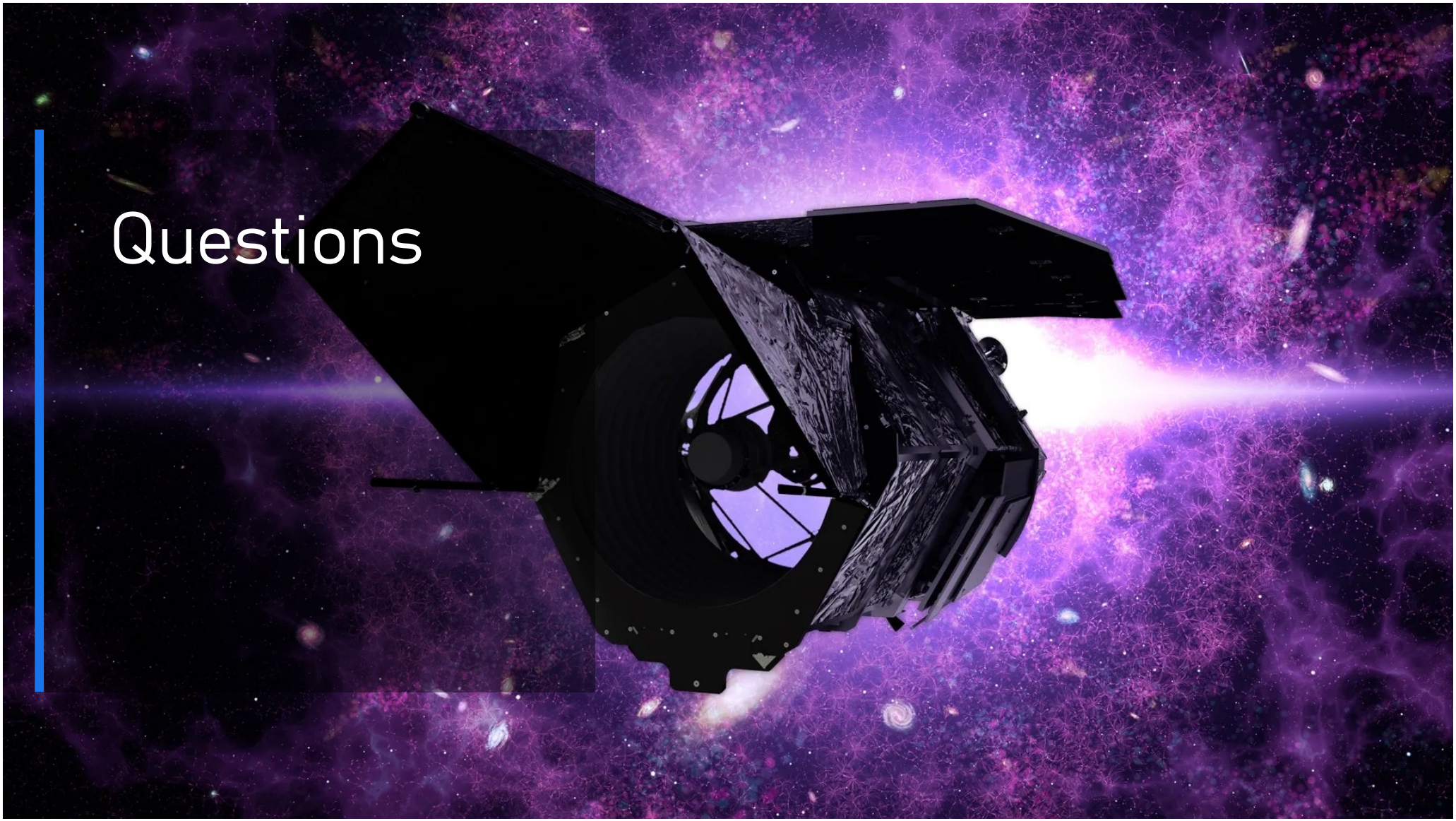
And the Roman SN-PIT

# Questions



# Backup slide- models used

| Transient | SED Model |
|---|---|
| SN Ia | J. D. R. Pierel et al. (2022)[a] |
| SNIa-91bg | S. González-Gaitán et al. (2014)[a] |
| SN Iax | Jha & Dai[b] |
| CCSN | M. Vincenzi et al. (2019)[a] |
| SLSN-I | `MOSFiT slsn` |
| TDE | `MOSFiT tde` |
| ILOT | `MOSFiT csm` |
| KN | M. Bulla (2019) |
| PISN | `MOSFiT default` |
| AGN | ELAsTiCc (2025, in preparation) |

From Rose et al 2025