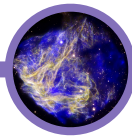


THE **S**IMULATED **C**ATALOG OF **O**PTICAL **T**RANSIENTS AND **C**ORRELATED **H**OSTS (SCOTCH)



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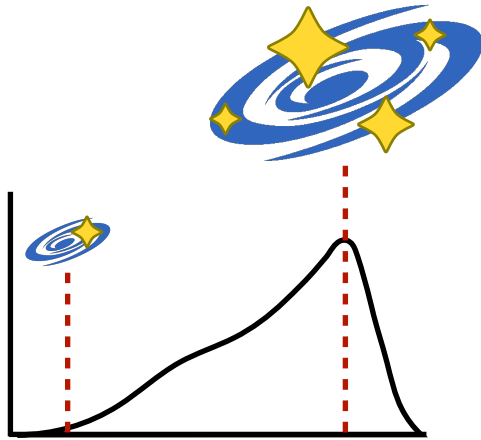


INCREASING THE REALISM OF HIGH-Z TRANSIENT SIMULATIONS

SCOTCH (2022)

True photometry for 13 extragalactic transient classes ($z < 3$)

Host association dependent on galaxy photometry (*griz*), color, M_* , *SFR*



**SN Ia
(2M)**

**SN II,IIIn
(2M)**

**SN IIb
(100k)**

**SN Ib
(100k)**

**SN Ic
(100k)**

**SN II,IIIn
(100k)**

**SN Iax
(100k)**

**SLSN-I
(100k)**

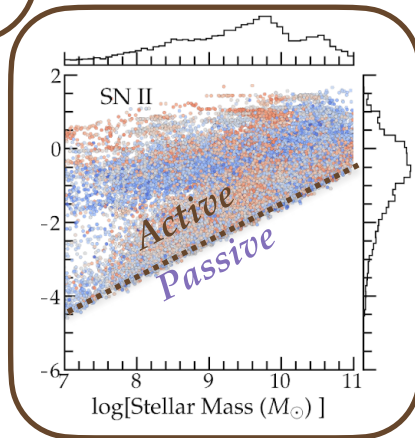
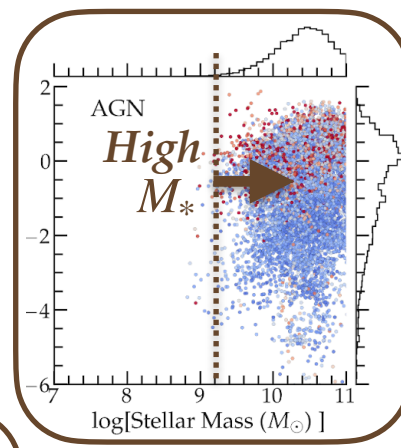
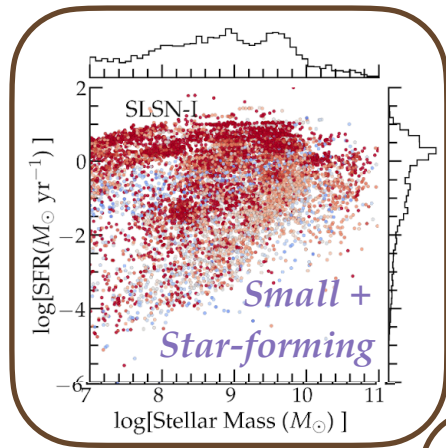
**KN
(100k)**

**AGN
(100k)**

**TDE
(100k)**

**SN 91bg
(100k)**

VALIDATING SYNTHETIC HOST-GALAXY CORRELATIONS: M_* AND SFR



Host selection from **host library** weighted by class-specific **weight map**

Weight maps encode **derived** host-galaxy correlations (M_* , SFR)

SLSNe-I found in **low-mass, blue galaxies***, SNe II (core-collapse) in **active galaxies****, and AGN in **massive galaxies*****.

*Perley+2016, Wiseman+2020

**Kelly+2012

***Kauffmann+2003

PROPERTIES OF IDEALIZED TRANSIENT LIGHT CURVES

Transient photometry is

High-cadence:

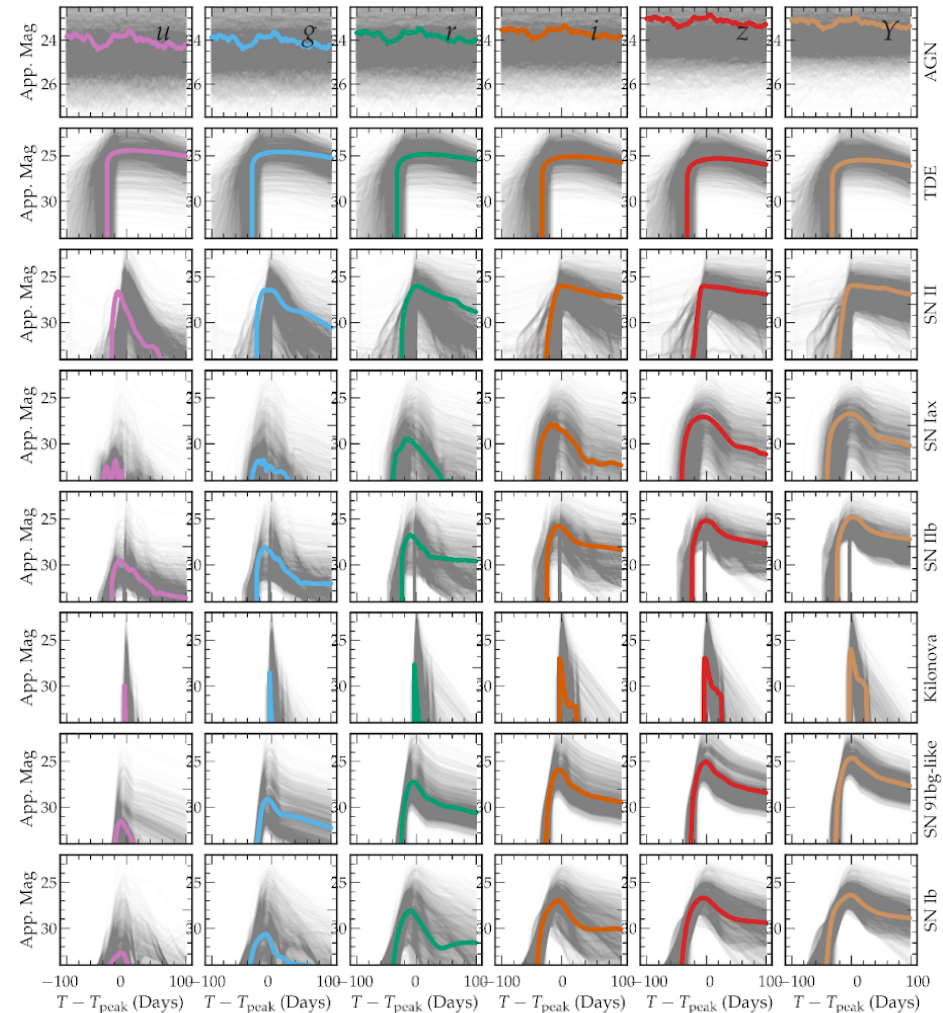
Regular 2-day for most classes
Variable for rapidly-evolving transients (KN)

Top-of-the-galaxy:

No atmosphere
No Galactic extinction

Host-extincted

Transients also placed at realistic offsets from their host galaxies.



CONCLUSION: SCOTCH FOR UPCOMING TIME-DOMAIN SURVEYS

Catalog of 5M optical transients of 13 extragalactic classes ($z < 3$) with realistic host-galaxy properties. Paper now in DESC internal review!

MNRAS **000**, 1–21 (2021)

Preprint 2 February 2022

Compiled using MNRAS L^AT_EX style file v3.0

The Simulated Catalog of Optical Transients and Correlated Hosts (SCOTCH)

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Accepted XXX. Received YYY; in original form ZZZ

1. Simulations are **survey-agnostic***
**except for the LSST ugizy bands*
2. Host libraries, weight maps, and associated software **open-source**
3. Same host-association used for **ELAsTiCC**, with LSST-specific exposure time, footprint, and cadence.

(Lokken, Gagliano, et al., 2022)