



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



MARTINE LOKKEN
UNIVERSITY OF TORONTO

m.lokken@mail.utoronto.ca



ALEX GAGLIANO
UNIVERSITY OF ILLINOIS/CCA

gagliano2@illinois.edu



Collaborators:

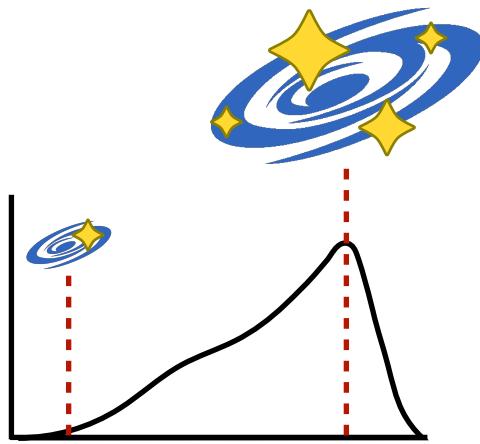
G. Narayan, R. Hložek,
R. Kessler, L. Salo,
J.F. Crenshaw, C. Alves,
A. Malz, M. Vincenzi

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)

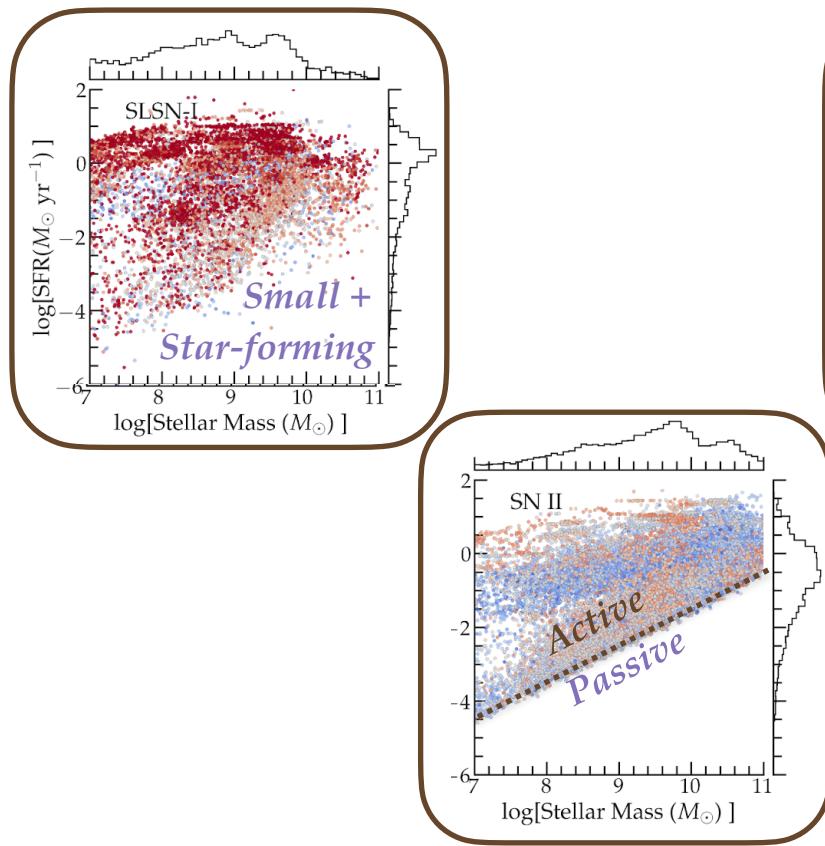
KN
(100k)

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:

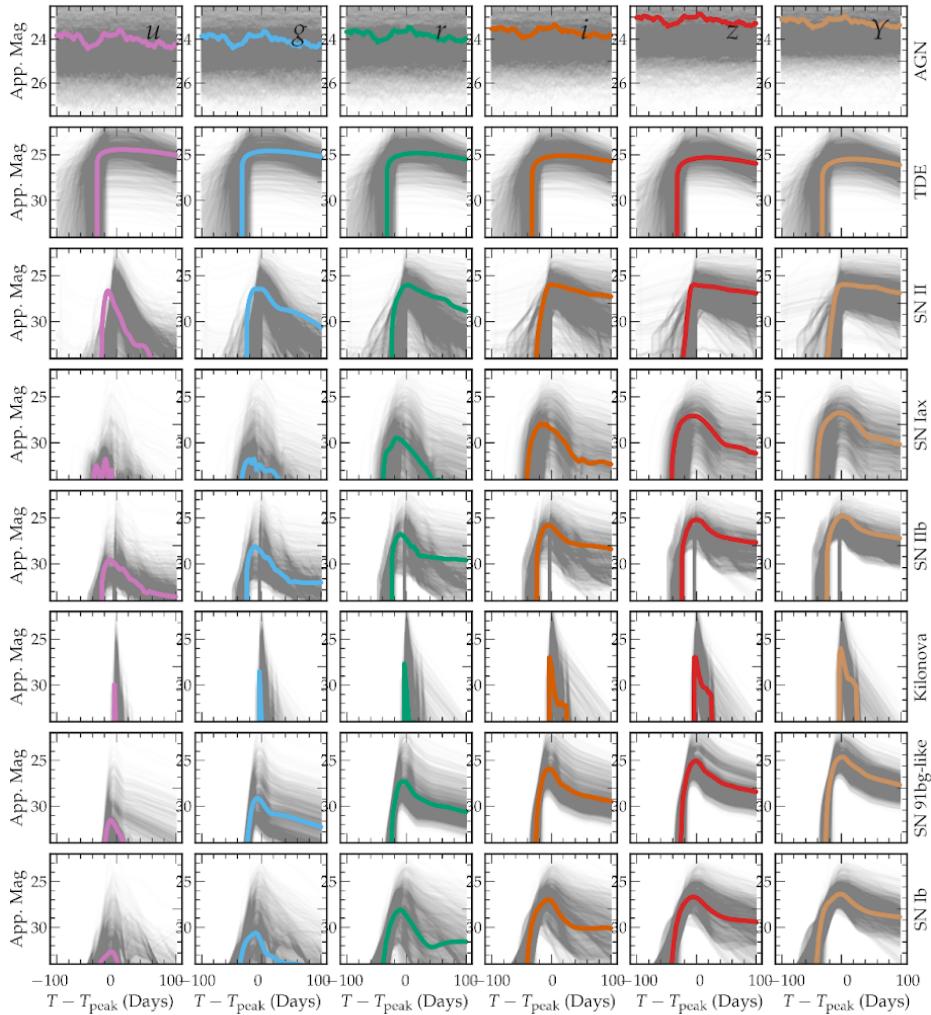
Regular 2-day for most classes
Variable for rapidly-evolving
transients (KN)

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!

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

Martine Lokken^{1,2,3*}, Alex Gagliano^{4,5,6}, Gautham Narayan^{4,5}, Renée Hložek^{1,3}, Rick Kessler^{7,8}, John Franklin Crenshaw⁹, Laura Salo¹⁰, Catarina Alves¹¹, Deep Chatterjee^{4,5}, Maria Vincenzi¹²,

¹David A. Dunlap Department of Astronomy and Astrophysics, University of Toronto, 50 St. George Street, Toronto, Ontario, M5S 3H4 Canada

²Canadian Institute for Theoretical Astrophysics, University of Toronto, 60 St. George St., Toronto, ON M5S 3H4, Canada

³Dunlap Institute of Astronomy & Astrophysics, 50 St. George St., Toronto, ON M5S 3H4, Canada

⁴Department of Astronomy, University of Illinois at Urbana-Champaign, 1002 W. Green St., IL 61801, USA

⁵Center for Astrophysical Surveys, National Center for Supercomputing Applications, Urbana, IL, 61801, USA

⁶National Science Foundation Graduate Research Fellow

⁷Department of Astronomy and Astrophysics, University of Chicago, Chicago, IL 60637, USA

⁸Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL 60637, USA

⁹Department of Physics, University of Washington, Box 351560, Seattle, WA 98195

¹⁰School of Physics and Astronomy, University of Minnesota, 116 Church Street S.E., Minneapolis, MN 55455, USA

¹¹Department of Physics & Astronomy, University College London, Gower Street, London WC1E 6BT, UK

¹²Department of Physics, Duke University Durham, NC 27708, USA

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(Lokken, Gagliano, et al., 2022)

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.