Samaporn (Kaew) Tinyanont

Staff Researcher
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Education

California Institute of Technology, Pasadena, CA, 2015-2020
Ph.D. in Astrophysics, June 2020; *M.S. in Astrophysics, June 2017*
Thesis title: Insights into Stellar Explosions from Infrared Light
Advisors: Prof. Dimitri Mawet and Prof. Mansi Kasliwal

Harvey Mudd College, Claremont CA, 2011-2015
B.S. in Physics with Astronomy concentration, May 2015

Appointments

Staff researcher, NARIT, Thailand	2023-present
Postdoctoral scholar, University of California, Santa Cruz	2020-2023
Research and teaching assistant, California Institute of Technology	2015-2020
Summer research assistant, Carnegie Observatories	2013, 2014
Teaching assistant, Harvey Mudd College and Pomona College	2012-2014

Invited Talk

Pomona College physics colloquium, April 2021, “Spectacular Death of Massive Stars”

Seminar and Conference Oral Presentations

IAUC 361 Massive Stars Near and Far, Ireland, 2022, and **SuperVirtual**, Nov 2021: The Mysterious SN 2020wnt: A Superluminous Supernova That Defies All Models (Even Magnetars!)

AAS Winter meeting, Honolulu, HI, 2020: Dissertation talk, Insights into stellar explosions from infrared light

SPIE Optics+Photonics, San Diego, CA, 2019: Achieving a spectropolarimetric precision of 0.1% with WIRC+Pol

Fifty-one Erg, North Carolina State University, Raleigh, NC, 2019: First silicate dust detection in an interacting SN 2014C

AAS Winter, Seattle, WA, 2019: WIRC+Pol: Low-resolution near-infrared linear spectropolarimeter

Awarded Telescope Time as Principal Investigator

***Hubble Space Telescope*:** General Observer Cycle 29, 2 orbits with WFC3 imaging and IR spectroscopy, “Supernova 2020wnt: a pair-instability explosion in our backyard?”, $22,844

***James Webb Space Telescope*:** General Observer Cycle 1, 3 hours MIRI MRS and NIRSpec IFU, “Chemistry of Mass Loss in the Interacting Stripped-Envelope Supernova 2014C”, $39,690

Gemini Observatory (8-meter)
- 2022B, 2023A, 58 hr, NIRI+FLAMINGOS-2, NIR imaging of supernovae (band 2, 3)
- 2022AB, 6.9 hr, GMOS, rapid (<24 hr) spectroscopy of young supernovae (rapid ToO, band 1)
- Fast Turnaround 2021AB, 7 hr, GNIRS spectroscopy and NIRI imaging of SN 2020wnt
- Fast Turnaround 2018A, 3 hr, 3-5 μm imaging (NIRI) and spectroscopy (GNIRS) of SN 2014C

NASA InfraRed Telescope Facility (3-meter)
- 2021AB, 2022AB, 20 nights, SpeX, Near-infrared spectroscopy of supernovae

Shane Telescope, Lick Observatory (3-meter)
- 2021B/2022A, 6 nights, adaptive optics imaging of Galactic massive stars.

Hale Telescope, Palomar Observatory (5-meter)
- 2018B-2019B, 5 ToO each semester to obtain near-IR spectropolarimetry of bright SNe
- 2017B (2 nights), 2018A (4 nights), TripleSpec near-IR spectroscopy of SNe 2014C, 2017eaw

Deputy PI of Keck Strategic Mission Support program "Keck Infrared Transient Survey (KITS)" (PI R Foley), NIRES, 12 half nights and 2 ToOs per semester for 2022A, B, and 2023A to obtain census of near-IR spectroscopy of SNe of all types

Press Coverage

NASA press release for my paper on *TESS* early-time photometry and *HST* UV spectroscopy of SN 2020fqv https://hubblesite.org/contents/news-releases/2021/news-2021-007

Professional Activities & Training

Organizing UCSC FLASH talk series, Mar 2021-Sep 2022
Proposal reviewer, Gemini fast turnaround; *HST* TAC; National Astronomical Research Institute of Thailand (NARIT) 2020-2021 and 2022-2023 observation cycles
Executive Secretary for a NASA review panel, 2019
Attended the Dunlap Institute Summer School in Astronomical Instrumentation, Aug 2016

Observing and Technical Experience

W.M. Keck Observatory (10m)
Optical spectroscopy, LRIS (4 nts)
NIR spectroscopy, NIRES/MOSFIERE (+10 nts)
Gemini Telescopes (8m)
NIRI, GNIRS, FLAMINGOS-2, and GMOS
NASA IRTF (3m)
Near-IR spectroscopy, SpeX (+20 nts)

Hale Telescope, Palomar Observatory (5m)
NIR spectropolarimetry, WIRC+Pol (+50 nts)
NIR imaging, WIRC (+20 nts)
NIR spectroscopy, TripleSpec (10 nts)
Shane Telescope, Lick Observatory (3m)
Optical spectroscopy, Kast (10 nts)
AO imaging, ShARCS (3 nts)

Microscopic imaging to inspect parts for WIRC+Pol; Imaging detector characterization
Software and programming language: Python, SQL, IDL, IRAF

Outreach Activities

Public talk for National Science Museum, Thailand on "Supernova: when a star dies" (in Thai)
Public talk for Palomar Observatory on spectropolarimetry
Caltech Astronomy's public lecture "Brown dwarfs: too small a star, too massive a planet"
Carnegie Open House and high-school STEM program volunteer

Publication List

First-Author Refereed Publications

Progenitor and Close-In Circumstellar Medium of Type II Supernova 2020fqv from High-Cadence Photometry and Ultra-Rapid UV Spectroscopy, **Samaporn Tinyanont**; Ryan Ridden-Harper; Ryan Foley; Viktoriya Morozova; Charlie Kilpatrick; et al, 2021, *The Monthly Notices of the Royal Astronomical Society*.

Press releases: https://hubblesite.org/contents/news-releases/2021/news-2021-007
https://news.ucsc.edu/2021/10/supernova-rosetta.html

News coverage:
https://www.pbs.org/wgbh/nova/article/star-explodes-supernova-hubble-tess/
https://www.sciencenews.org/article/supernova-explosion-2020fqv-tess-hubble
https://www.cnn.com/2021/10/21/world/hubble-telescope-doomed-star-scn/index.html

Infrared spectropolarimetric detection of intrinsic polarization from a core-collapse supernova, **Samaporn Tinyanont**; Maxwell Millar-Blanchaer; Mansi Kasliwal; Dimitri Mawet; et al., 2021, *Nature Astronomy*.

Supernova 2014C: Ongoing Interaction with Extended Circumstellar Material with Silicate Dust, **Samaporn Tinyanont**; Ryan Lau; Mansi Kasliwal; et al., 2019, *The Astrophysical Journal*, 887, 75T.

Supernova 2017eaw: Molecule and Dust Formation from Infrared Observations, **Samaporn Tinyanont**; Mansi Kasliwal; et al., 2019, *The Astrophysical Journal*, 973, 127.

WIRC+Pol: A Low-Resolution Near-Infrared Spectropolarimeter , **Samaporn Tinyanont**; Dimitri Mawet; Maxwell Millar-Blanchaer; Ricky Nilsson; et al., 2019, *Publications of the Astronomical Society of the Pacific*, 131, 025001.

A Systematic Study of Mid-Infrared Emission from Core-Collapse Supernovae with SPIRITS, **Samaporn Tinyanont**; Mansi Kasliwal; et al., 2016, *The Astrophysical Journal*, 833, 231.

Refereed Publications with Significant Contribution

Discovery of a 310-day Period from the Enshrouded Massive System NaSt1 (WR 122), Ryan M. Lau, **S. Tinyanont**, et al., 2021, accepted for publication in *The Astrophysical Journal*

I performed the light curve fit and measured the period and photometric variability of the massive star system NaSt1. This was the best evidence yet that this system harbors a binary.

SPIRITS: Uncovering Unusual Infrared Transients with Spitzer, Mansi M. Kasliwal; et al., including **S. Tinyanont**, 2017, *The Astrophysical Journal*, 839, 88.

I cataloged archival observations from *Spitzer* to be used as image subtraction reference for the SPitzer InfraRed Intensive Transient Survey (SPIRITS). I observed and identified molecular hydrogen lines in SPIRITS14ajc.

Conference Proceedings

Achieving a Spectropolarimetric Precision Better than 0.1% in the Near-Infrared with WIRC+Pol, **Samaporn Tinyanont**; Maxwell Millar-Blanchaer; Nemanja Jovanovic; Dimitri Mawet; et al., 2019, *Proceedings of the SPIE*, Vol 11132, 1113209

WIRC+Pol: Low-Resolution Near-Infrared Spectropolarimeter, **Samaporn Tinyanont**; Maxwell Millar-Blanchaer; Ricky Nilsson; Dimitri Mawet; et al., 2018, *Proceedings of the SPIE*, Vol 10702, 107023J

Software Product

WIRC+Pol Data Reduction Pipeline, python-based and publicly available at https://github.com/WIRC-Pol/wirc_drp

Other Refereed Publications

Transient Astronomy

Final Moments I: Precursor Emission, Envelope Inflation, and Enhanced Mass loss Preceding the Luminous Type II Supernova 2020tlf, Wynn V Jacobson-Galán, et al., including **S. Tinyanont**, 2021, submitted to *The Astrophysical Journal*.

PGIR 20eid (SN2020qmp): A Type II-P Supernova at 15.6 Mpc discovered by the Palomar Gattini-IR survey, Gokul P. Srinivasaragavan, et al., including **S. Tinyanont**, 2021, submitted to *Astronomy & Astrophysics*

SN 2021csp -- the explosion of a stripped envelope star within a H and He-poor circumstellar medium, Morgan Fraser, et al., including **S. Tinyanont,** 2021, submitted.

The Early Phases of Supernova 2020pni: Shock-Ionization of the Nitrogen-Enriched Circumstellar Material, Giacomo Terreran, et al., including **S. Tinyanont,** 2021, submitted to *The Astrophysical Journal*.

An Early-Time Optical and Ultraviolet Excess in the type-Ic SN 2020oi, Alexander Gagliano, et al., including **S. Tinyanont,** 2021, submitted to *The Astrophysical Journal*.

A Population of Heavily Reddened, Optically Missed Novae from Palomar Gattini-IR: Constraints on the Galactic Nova Rate, Kishalay De, et al., including **S. Tinyanont,** 2021, *The Astrophysical Journal,* 912, 19D.

The Young Supernova Experiment: Survey Goals, Overview, and Operations, David O Jones, et al., including **S. Tinyanont**, 2021, *The Astrophysical Journal*, 908, 143J.

Discovery of an Intermediate-luminosity Red Transient in M51 and Its Likely Dust-obscured, Infrared-variable Progenitor, Jacob Jencson, et al., including **S. Tinyanont**, 2019, *The Astrophysical Journal Letters*, 880, 2.

The fast, luminous ultraviolet transient AT2018cow: extreme supernova, or disruption of a star by an intermediate-mass black hole?, Daniel Perley, et al., including **S. Tinyanont**, 2019, *Monthly Notices of the Royal Astronomical Society*, 484, 1.

The SPIRITS Sample of Luminous Infrared Transients: Uncovering Hidden Supernovae and Dusty Stellar Outbursts in Nearby Galaxies, Jacob Jencson, et al., including **S. Tinyanont**, 2019, *The Astrophysical Journal*, 886, 40J.

Spitzer observations of SN 2014J and properties of mid-IR emission in Type Ia supernovae, Joel Johansson, et al., including **S. Tinyanont**, 2017, *Monthly Notices of the Royal Astronomical Society*, 466, 3.

SPIRITS 15c and SPIRITS 14buu: Two Obscured Supernovae in the Nearby Star-forming Galaxy IC 2163, Jacob Jencson, et al., including **Tinyanont**, 2017, *The Astrophysical Journal*, 837, 2

An Excess of Mid-infrared Emission from the Type Iax SN 2014dt, Ori D. Fox, et al., including **S. Tinyanont**, 2016, *The Astrophysical Journal Letters*, 816, 1.

Other Publications

A Search for Planetary Metastable Helium Absorption in the V1298 Tau System , Shreyas Vissapragada, et al., including **S. Tinyanont**, 2021, accepted for publication in *The Astronomical Journal*.

Census of R Coronae Borealis Stars. I. Infrared Light Curves from Palomar Gattini IR, Viraj Karambelkar, et al., including **S. Tinyanont**, 2021, *The Astrophysical Journal*, 910, 132K.

Constraints on Metastable Helium in the Atmospheres of WASP-69b and WASP-52b with Ultranarrowband Photometry, Shreyas Vissapragada, et al., including **S. Tinyanont**, 2020, *The Astronomical Journal*, 159, 278V.

Diffuser-Assisted Infrared Transit Photometry for Four Dynamically Interacting *Kepler* Systems, Shreyas Vissapragada, et al., including **S. Tinyanont**, 2020, *The Astronomical Journal*, 159, 108V.