SoXSWG6: Fast&Extreme **Transients (including SLSNe)**

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Science Topics



Faint

Luminous

Rapidly Evolving



Adapted from Arcavi et al. (2016)

Fast & Luminous

Data sources: Arcavi+2011,2016 Bignotti+1998 Drout+2011,2014 Fassia+2000 Gal-Yam+2009 Greiner+2015 Hosseinzadeh+17 Kasliwal+2011 Leonard+2000 Li+1998 Liu+2000Nakamura+1998 Ofek+2007,2010 Perley+2019 Poznanski+2011 Pritchard+2019 Pursiainen+2017 Quimby+2011 Rest+2018 Smith+2007 Taddia+2015 Vinko+2012,2015 Whitesides+2017







Science Topics



Luminous

Faint

Rapidly Evolving

Expect ~2 events per year, ~10h / event to classify the population.





Faint

Science Topics

Fast and not so Luminous - Ca-Strong

Diverse in Photospheric Phase



Similar in Nebular Phase



Lunnan et al. 2017

Fast and not so Luminous - Ca-Strong



Kasliwal et al. 2012

Fast and not so Luminous - Even More Extreme



De et al. 2018



Fast and not so Luminous - Ibn's



log F_A

Hosseinzadeh et al. (2017)



Pastorello et al. (2015)



Fast and not so Luminous - Ibn's

Type Ibn Supernovae May not all Come from Massive Stars







Faint

Science Topics

Expect ~15 events per year, ~10h / event to classify the population.





Faint

Science Topics



Expect ~5 events per semester for a complete and controlled sample, 10h event





Faint

Science Topics





Slow and Faint



Gutierrez et al. 2020





Faint

Science Topics





Expect 1 event per year, 24h / event







Faint

Science Topics



14hls-likes

DES16C3cje -likes

14hls-like



Arcavi et al. (2017), Yang et al. (2020)









Faint

Science Topics

SLSNe

14hls-likes

Expect 1/3-1 event per year, 18h / event to measure velocity evolution.

DES16C3cje -likes







Science Topics

Supernovae II-(very)L



Reynolds et al. 2020







Science Topics





Fast & luminous (can't be powered by Ni)	10h / event to classify the popu
Fast & not so luminous ("gap" transients, including Ca-strong, fast Ibn's and O2bj-likes)	10h / event to classify the popu
SLSNe: Complete and controlled sample to within a certain distance	10h / event for 5 events per yea
Luminous very linear Type II's: Spectra to check for narrow lines at early phases.	10h / event, for 1/2 event per ye
Slow and faint (DES16C3cje-like)	2h per month. Expect ~1 per ye
14hls-like	~1h once a month for ~3 years t velocity evolution. Expect 1/3-1
Slowly-evolving Ibn's	<1 event per semester, ten 1.2h
Total:	249 hours per year

llation. Expect 2 eve	ents per year. Total time: 20h per year.	Iair, Rubina, Claudia, Giuliano, Stephen
llation. Expect 15 ev	ents per year. Total time: 150h per year.	Stephen, Stuart, Stefano, Sergio, Andrea, Giuliano
r. Total time: 50h p	er year.	Sergio, Stephen, Stefano, Hanin, Seppo
ear. Total time: 5 h p	er year.	Seppo, Claudia, Hanin
ear.		Claudia
o measure l events per year.	Total time: 24h per year	Iair, Andrea, Claudia, Enrico
spectra per event.		Andrea

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Possible Overlaps With Other WGs

- WG 5 (la's): Ca-rich class
- WG 7 (Intermediate Luminosity Transients)
- WG 8 (CC-SNe): Interaction-powered events
- WG 13 (Classifications)

• WG 12 (GWs): Rapidly evolving events (non-GW KNe?)

WG6 Todo List

- Discuss overlaps with other WGs
- Prepare proposal for science cases mentioned here (not covered in other WGs).
- The total request of 250 hours per year is to be divided between INAF, UTU, QUB, MAS, Tel Aviv, Weizmann, and Aarhus
- Anyone wishing to join, please contact lair