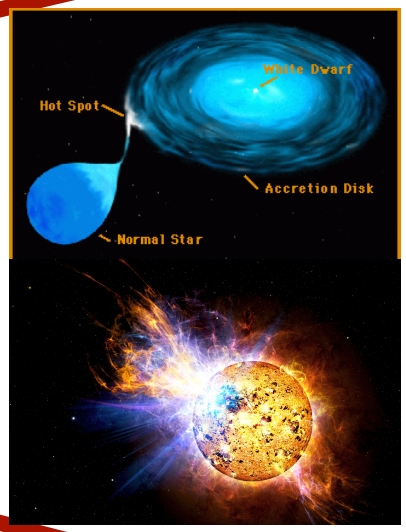
The Dynamic Optical Sky: False Positives

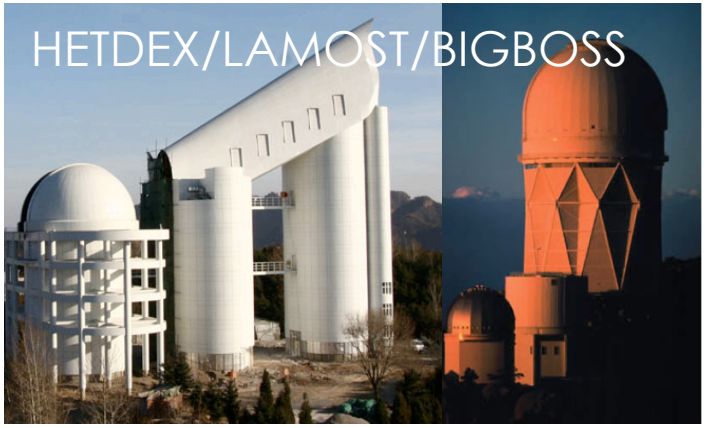
Solar System



Milky Way

Far-off Galaxies

Spectroscopy



Needle in 70 deg^2 haystack

27004 candidates in subtraction images

26960 are NOT known asteroids

4214 are astrophysical with machine learning score > 0.1

2740 do NOT have a quiescent stellar source

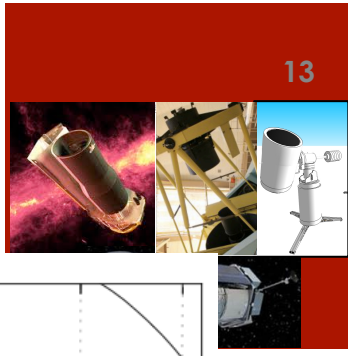
43 are detected in both visits and presented to human scanners

7 are deemed high-value by humans and saved with an iPTF name

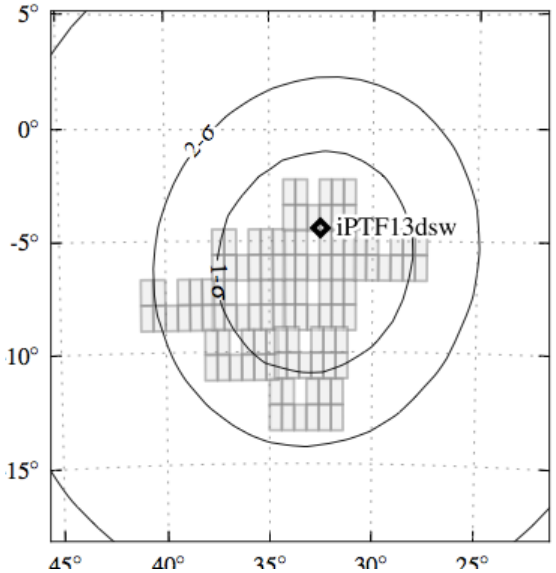
3 are scheduled for follow-up spectroscopic observations

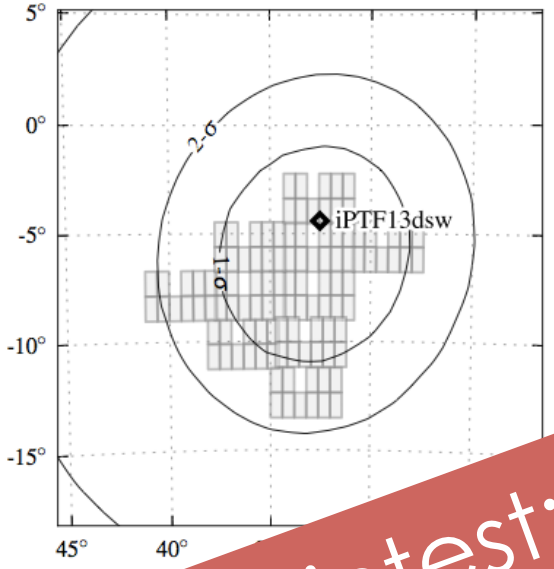
1 is the true afterglow

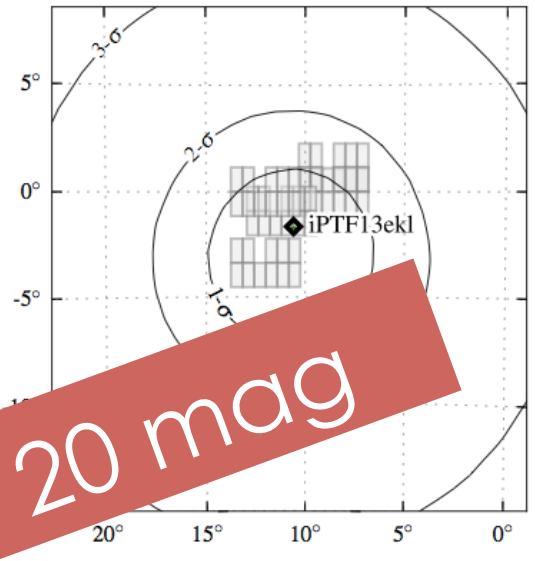
Singer et al. 2013

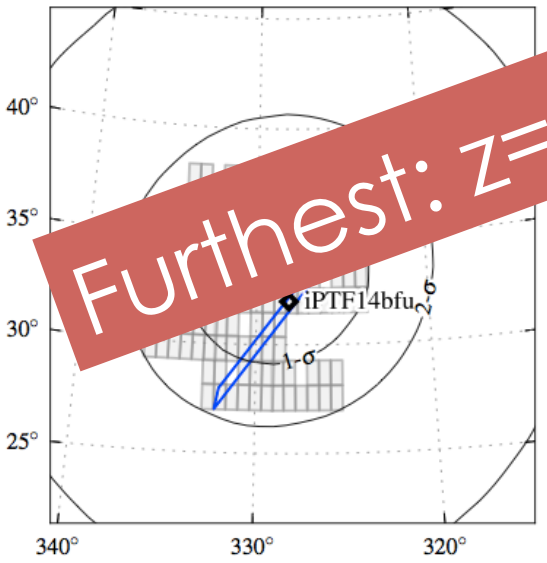


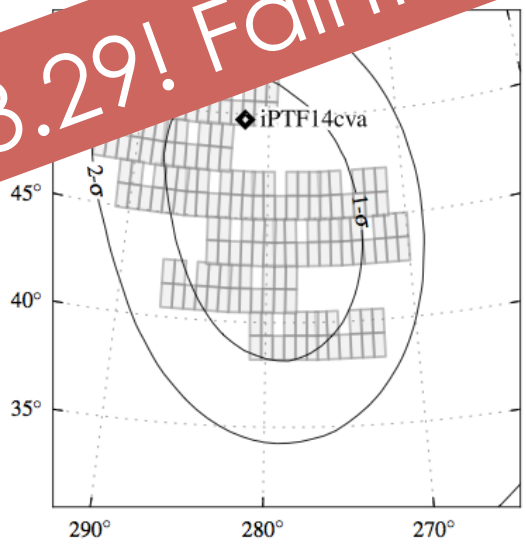
Demonstrated Eight times…

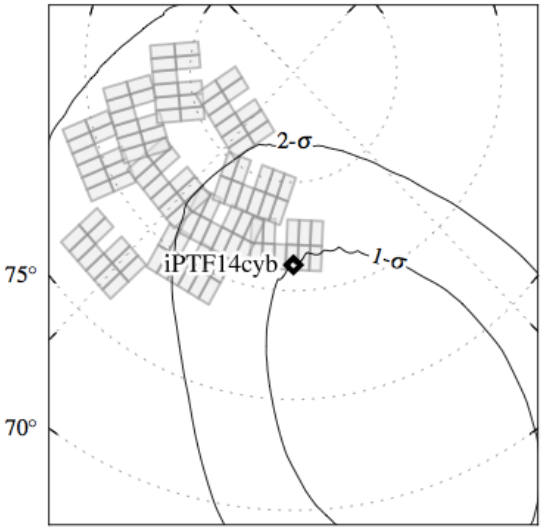








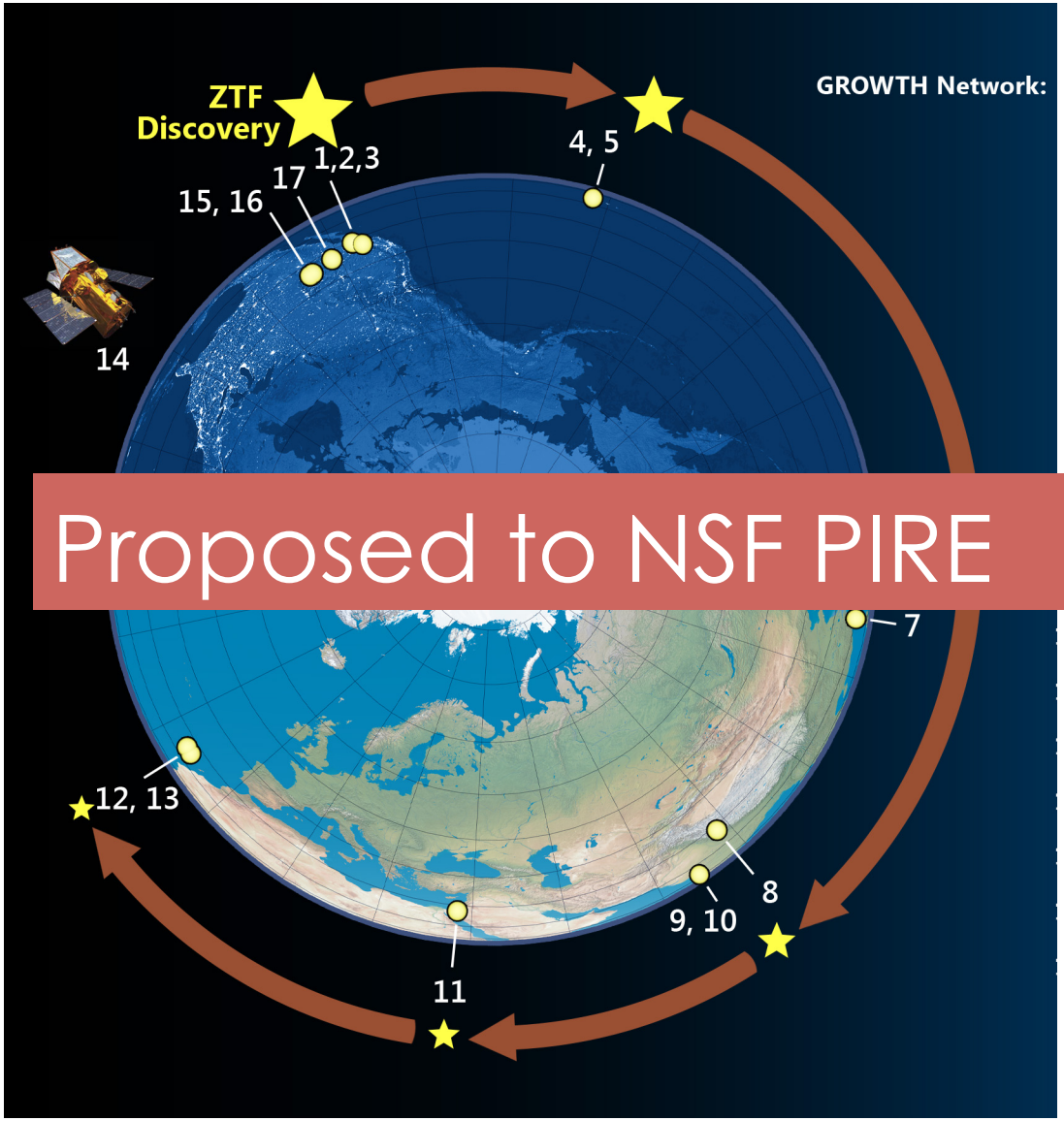




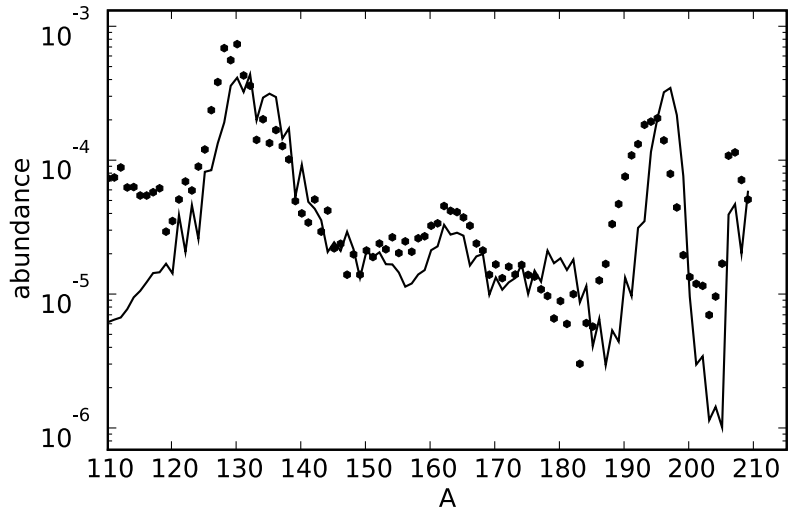
Furthest: z=3.29! Faintest: 20 mag

L. Singer, PhdT 2014

GROWTH: Global Relay of Observatories Watching Transients Happen

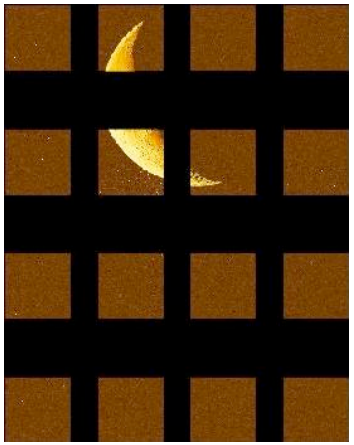


Proposed to NSF PIRE



Scenario III:
Infrared Transient Only

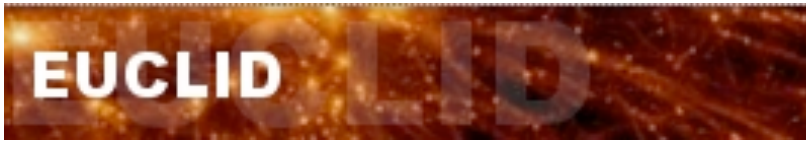
Potential for Infrared Surveys?



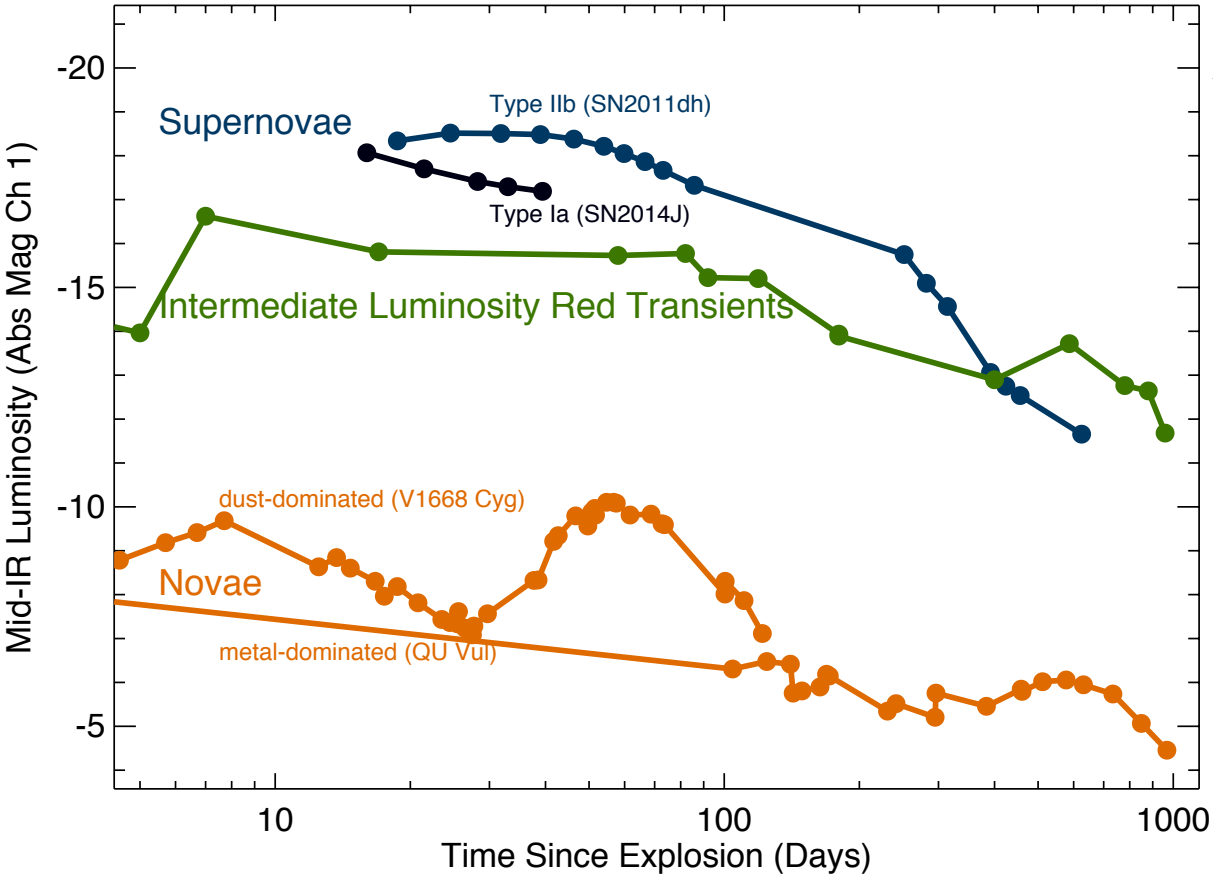
VIRCAM on VISTA
0.6 deg^2 on 4.1m

WFCAM on UKIRT
0.2 deg^2 on 3.8m

Proposed



SPIRITS:
SPitzer InfraRed Intensive Transients Survey



Awarded: 1130 Spitzer Hours

Years 2014-2016

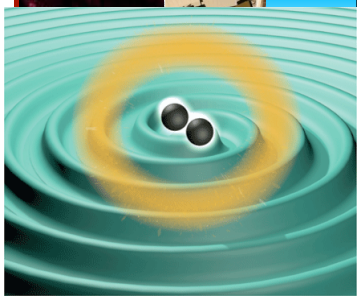
190 Galaxies x 3 epochs

110 nights/yr of near-IR imaging

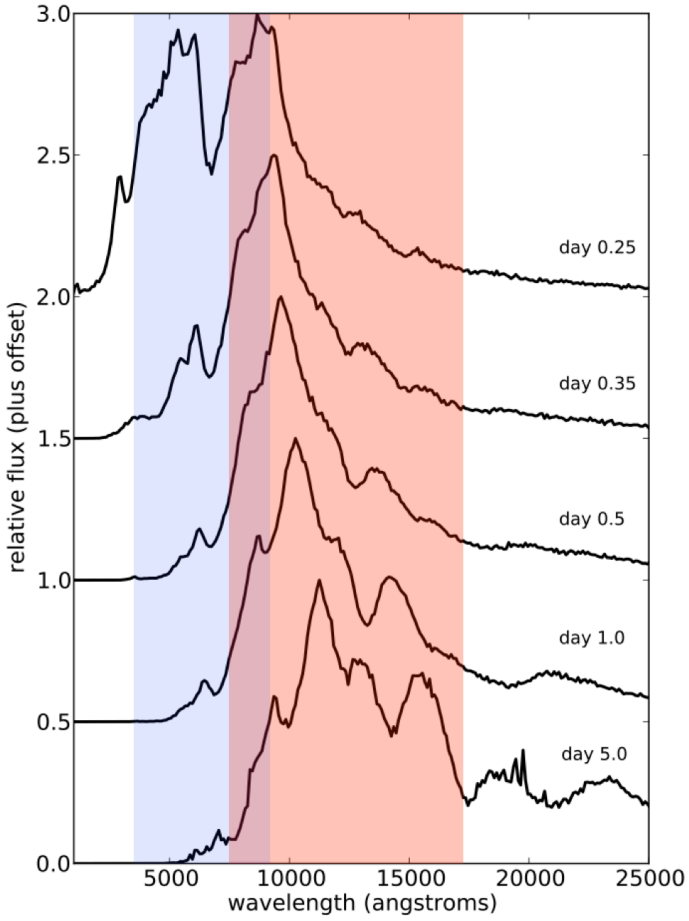
66 nights/yr of optical imaging

33 nights/yr of spectroscopy

40+ transients/yr
1200+ variables/yr



WFIRST-AFTA ToO:
Kilonovae from Neutron Star Mergers



Barnes & Kasen 2013, Kasen et al. 2013

A WFIRST-AFTA ToO Trigger:

Era of 3-5 advanced gravitational wave Interferometers at full sensitivity

~30 mergers localized to <6 sq deg in 5 yr

A 27 hour WFIRST-AFTA ToO:
- J+H imaging x 5 epochs (24-25 mag)
- Grism spectroscopy x 1 epoch (22 mag
- IFU spectrum x 1 candidate (25 mag)

See Hirata, Kasliwal & Nissanke, white paper for WFIRST-AFTA