Robotic follow-up observations

- Ampel v0.7
- Robotic telescope networks
- Ampel auto infant SNe
- Same same-night discoveries in ZTFII?

JN, Nicolas Miranda, Valery Brinnel…
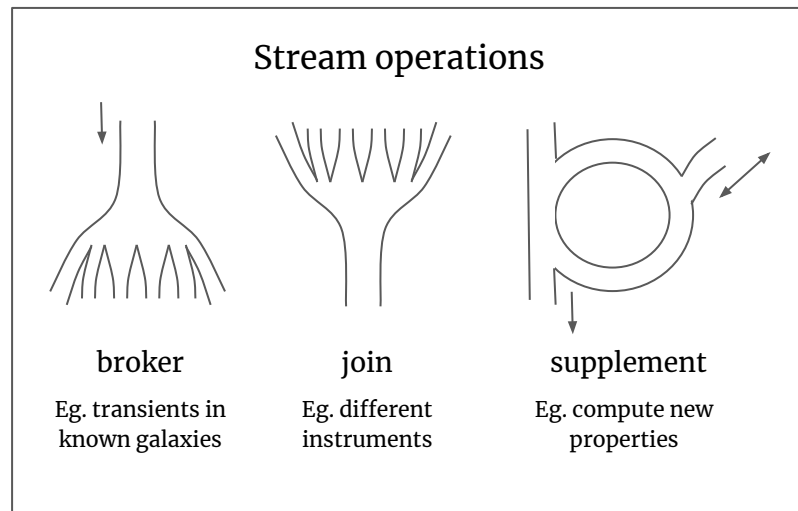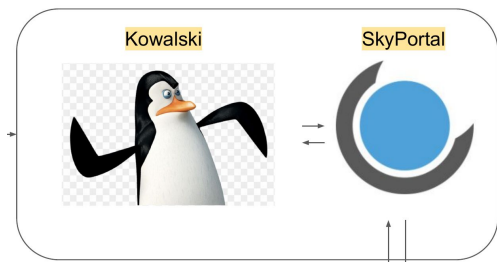Infant SN, RCF, SLSN groups…

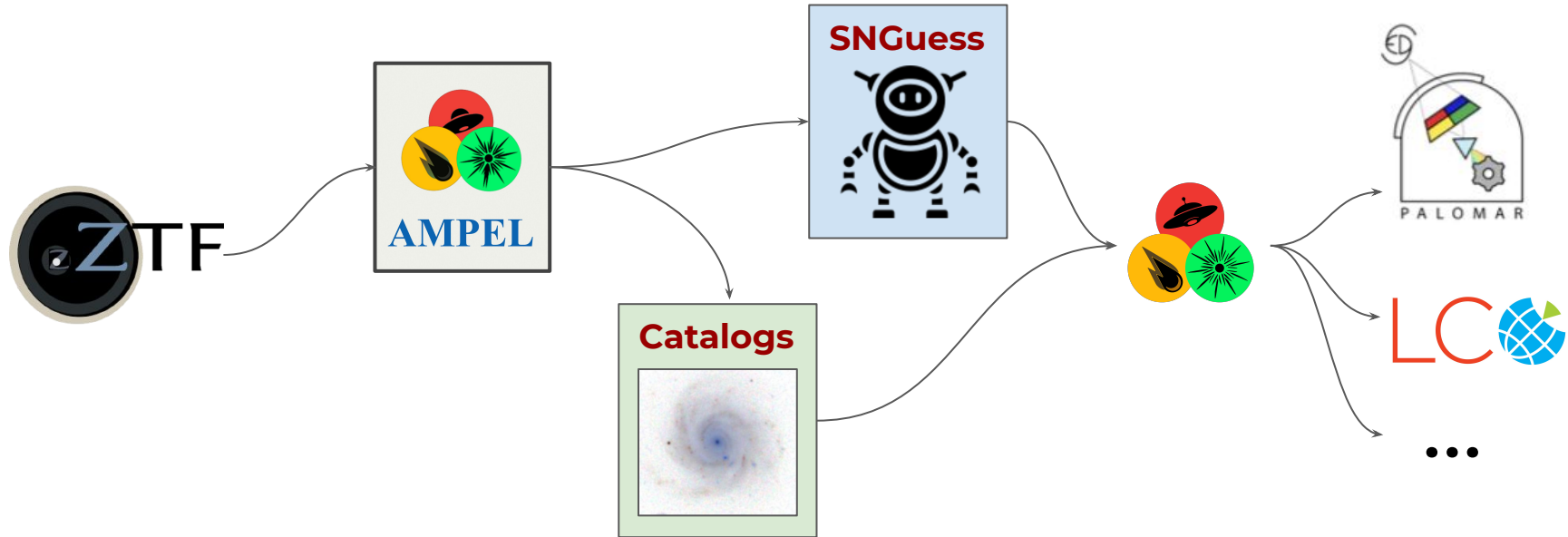# AMPEL v0.7 is now being deployed

AMPEL is a *modular* and *scalable* platform with explicit *provenance* tracking, suited for systematically processing large - possibly complex and heterogeneous - datasets in real-time or not. This includes selecting, analyzing, updating, combining, enriching and reacting to data.

AMPEL v0.7 allows arbitrary operations on arbitrary data streams.

Fritz integration coming…

Kowalski   SkyPortal

Stream operations

broker	join	supplement
Eg. transients in known galaxies	Eg. different instruments	Eg. compute new properties

AMPEL auto: Fully robotic reaction networks.

From ZTF exposure to completed follow-up observations in less than 30 min.
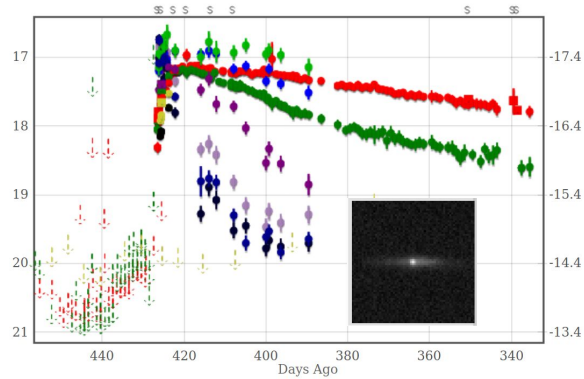
AMPEL auto: Targets

ZTF19abqhobb: SNIIP
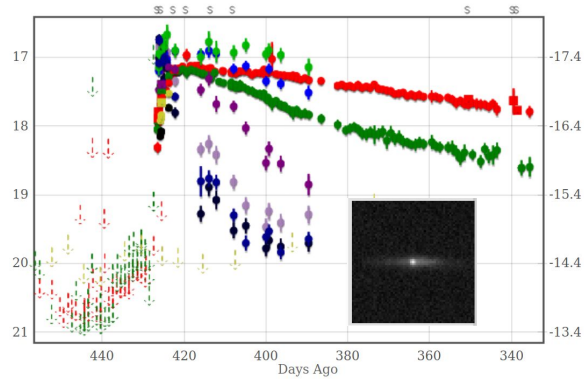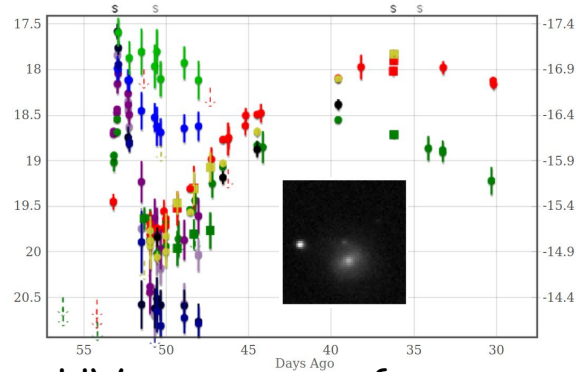

Golden standard for
IIP distances

AMPEL auto: Targets

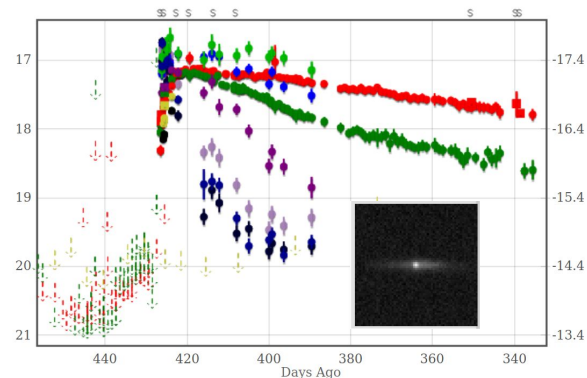ZTF19abqhobb: SNIIP

ZTF20abwzqzo: SNIIb

Golden standard for
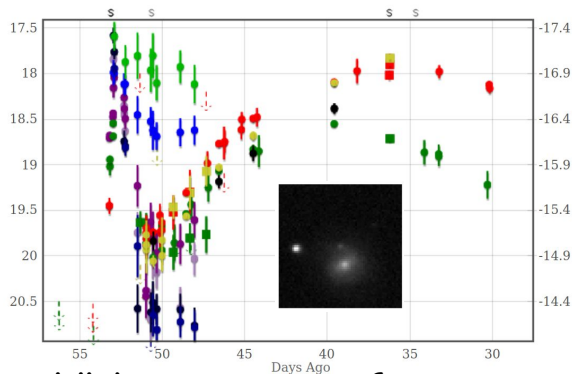IIP distances

UV coverage of
first peak

AMPEL auto: Targets
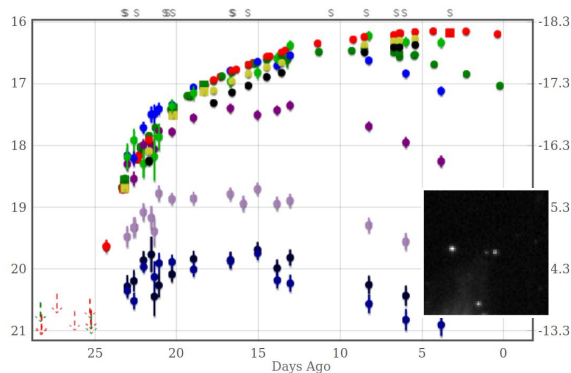
ZTF19abqhobb: SNIIP

Golden standard for
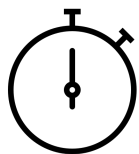IIP distances

ZTF20abwzqzo: SNIIb

UV coverage of
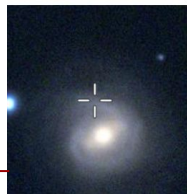first peak

ZTF20acdqjeq: SNIa 02cx

Signs of interaction?

Still missing: same night detections

The plan:

Non-detection

Detection

Alert sent

Confirmation

PALOMAR

Large facilities

Still missing: same night detections

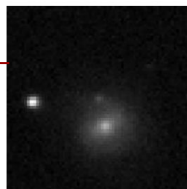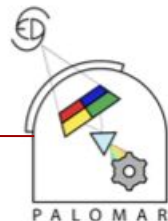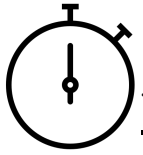The plan:

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Large facilities

Very hard to find since:
- Non-detection initially
- Detected within first few hours
- Only local SNe reach S/N threshold
- Sufficient time for P60 follow-up

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Still missing: same night detections
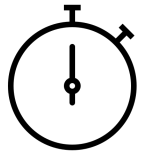
The plan:
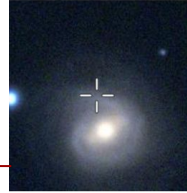
Non-detection
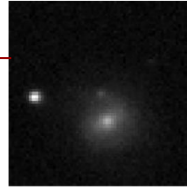
Detection

Alert sent

Confirmation
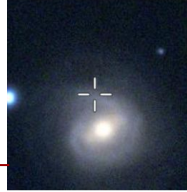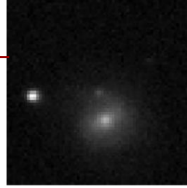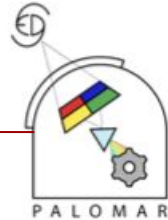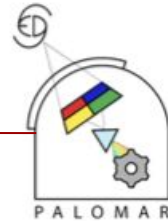
Large facilities

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Could be improved:
- Maximize area covered initially and mid-night
- Lower threshold candidate search
- SEDm override

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Summary

- Ampel v0.7
  - Will be activated for more and more streams
- Robotic telescope networks
  - Immediate and systematic transient studies
- Ampel auto infant SNe
  - Look for detailed studies
- Same same-night discoveries in ZTFII?
  - Probability can be greatly increased
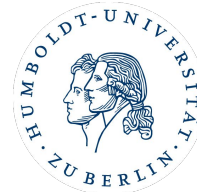
RiseDecline + SNGuess

Table 1. RiseDecline features

Name	Type	Description	Source
tPredetect	Time	Time between final good upper limit and first detection.	LC
tLC	Time	Duration (time between first and most recent detection).	LC
ndet	Int	Number of significant detections.	LC
peaked	Bool	Is the lc estimated to be declining?	LC
pure	Bool	No significant non-detections after first detection.	LC
rising	Bool	Max brightness close to the most recent detection.	LC
norise	Bool	No (significant) detected rise.	LC
hasgaps	Bool	The LC has a gap between detections of at least 30 days.	LC
mPeak	mag	Magnitude at peak light (any band). Only calculated if peaked==True.	LC
mDet	mag	Magnitude at detection (any band).	LC
mLast	mag	Magnitude of most recent detection (any band).	LC
cPeak	g-r	Color at peak (if peaked and with g and r).	LC
cDet	g-r	Color at detection (if with g+r).	LC
cLast	g-r	Color at last detection (if with g+r).	LC
slopeRise g,r	mag/time	g or r mag slope between detection and peak (None if norise).	LC
slopeDecline g,r	mag/time	g/r magnitude slope between peak and last detection (None unless peaked).	LC
rb (med)	Float	Median Real Bogus (all detections).	LC
drb (med)	Float	Median deep Real Bogus (if available, all detections).	LC
distnr	pixel	Distance to nearest source in reference image	Alert
magnr	mag	Magnitude of nearest source in reference image.	Alert
classtar	Float	Star/Galaxy classification score from SExtractor.	Alert
sgscore1	Float	Star/Galaxy score of closest source from PS1 catalog.	Alert
distpsnr1	arcsec	Distance to closest source from PS1 catalog.	Alert
sgscore2	Float	Star/Galaxy score of next to closest source from PS1 catalog.	Alert
distpsnr2	Arcsec	Distance to next to closest source from PS1 catalog.	Alert
neargaia	arcsec	Distance to closest source from Gaia DR1.	Alert
maggaia	mag	Gaia (G-band) magnitude of closest source from Gaia DR1 catalog.	Alert

First SNguess triggers

Detection magnitude

Phase @ trigger for SNe Ia