

AZTEC

**AriZona
Transient
Exploration and
Characterization**

Arizona People Involved

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Telescopes:

SuperLOTIS – optical photometry (bright)

Kuiper 61" – optical photometry

VATT 1.8m – optical photometry

Bok 2.3m – optical spectroscopy

MN60" – IR photometry

UKIRT 3.8m – IR photometry

MMT 6.5m – optical & IR spectroscopy

LBT (2x8.4m) – optical spectra, deep imaging

Early times (changing quickly):

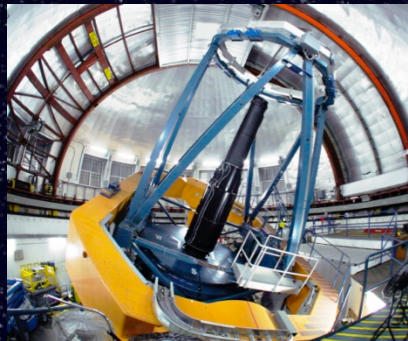
- Photometry @ Kuiper, VATT, & s-LOTIS
- Infrared photometry @ MN60 & UKIRT



Kuiper 61"



VATT 1.8m



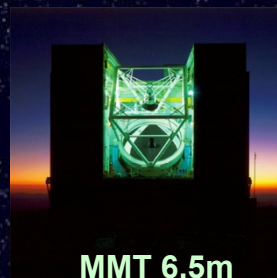
UKIRT 3.8m

- Spectroscopy @ Bok 2.3m
- Spectropolarimetry with SPOL on Bok
- Moderate-res spectra (MMT)

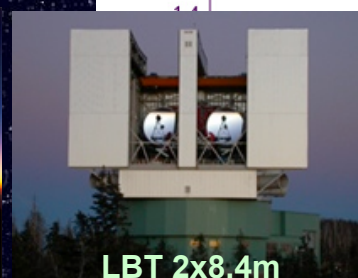


Late times (much fainter):

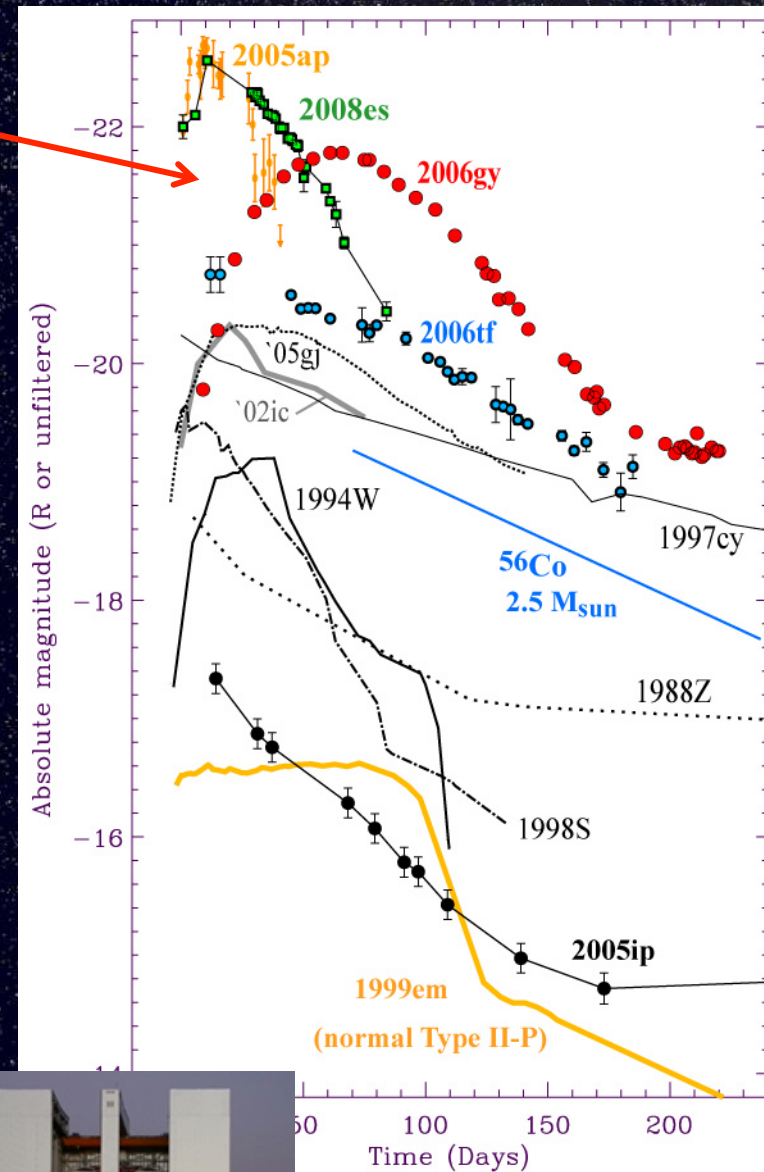
- Spectroscopy/photometry @ MMT & LBT
- Spectropolarimetry @ MMT



MMT 6.5m



LBT 2x8.4m



Explosive Transient Followup

Traditional Supernovae & Stellar Eruptions (monitoring):

- Bright: Weeks to Months
 - Broadband photometry (daily/weekly)**
 - Low-res optical spectra (every few days/weekly)**
 - Moderate-res optical spectra (weekly/monthly)**
 - Spectropolarimetry & near-IR for brighter targets**
- Fading: Months to year
 - Deep broadband photometry**
 - Deep optical spectroscopy**

Exceptional transients (fast transients / interrupt ToO): ASAP

- GRBs, Kilonovae, very young supernovae, stellar mergers, etc.
 - Broadband photometry (minutes, hours, days)**
 - Spectra & specpol (hourly on day 1, daily afterward)**
 - Need to see pipeline reduced spectra FAST to make decisions**

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**Doing this
currently with
classical mode
& robotically
with s-LOTIS**

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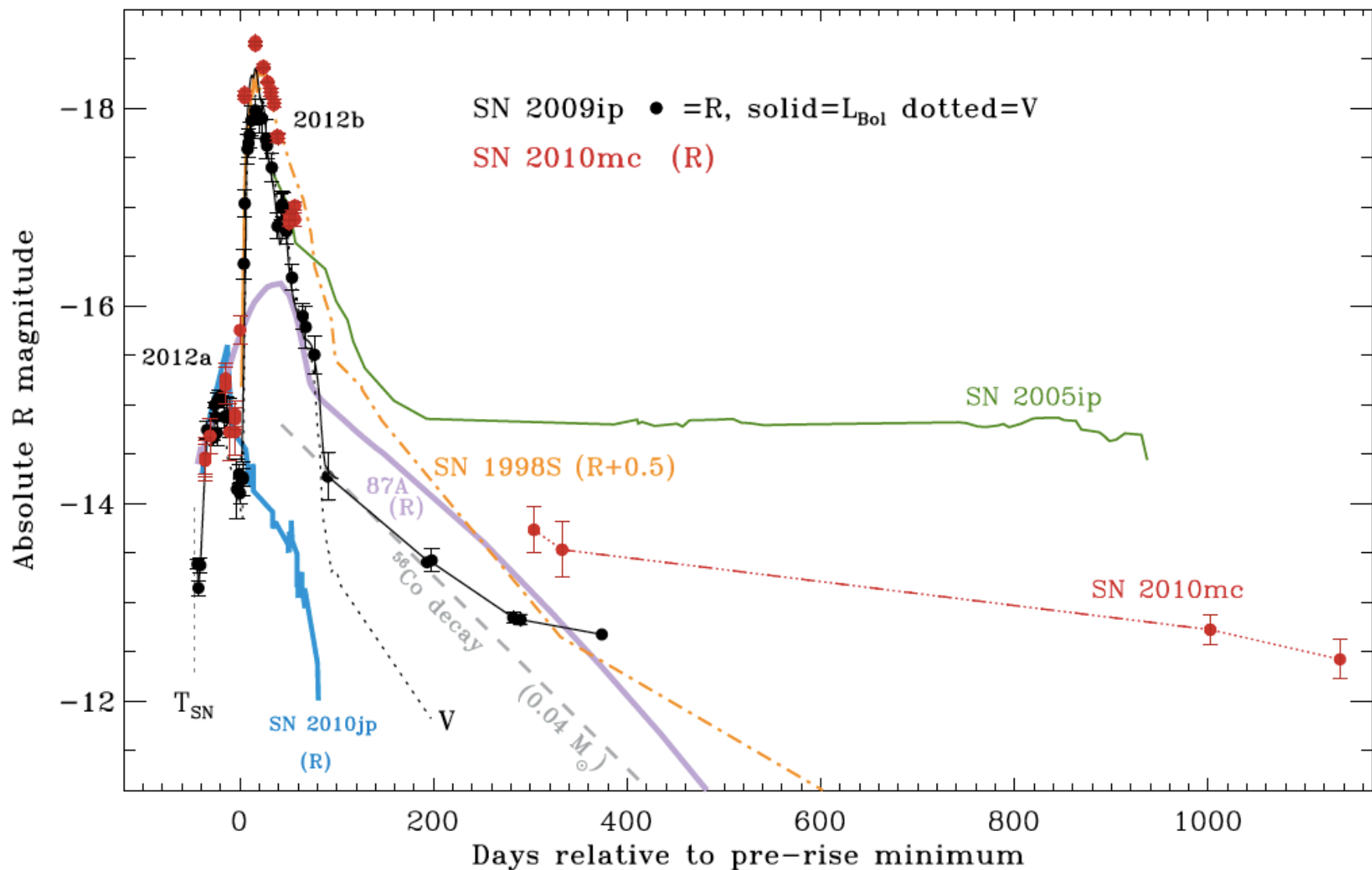
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This is currently much harder.

Usually involves begging friends and luck.

Example: SN 2009ip

(Smith et al. 2009, 2013, 2014, 2016; Mauerhan et al. 2013, 2014)



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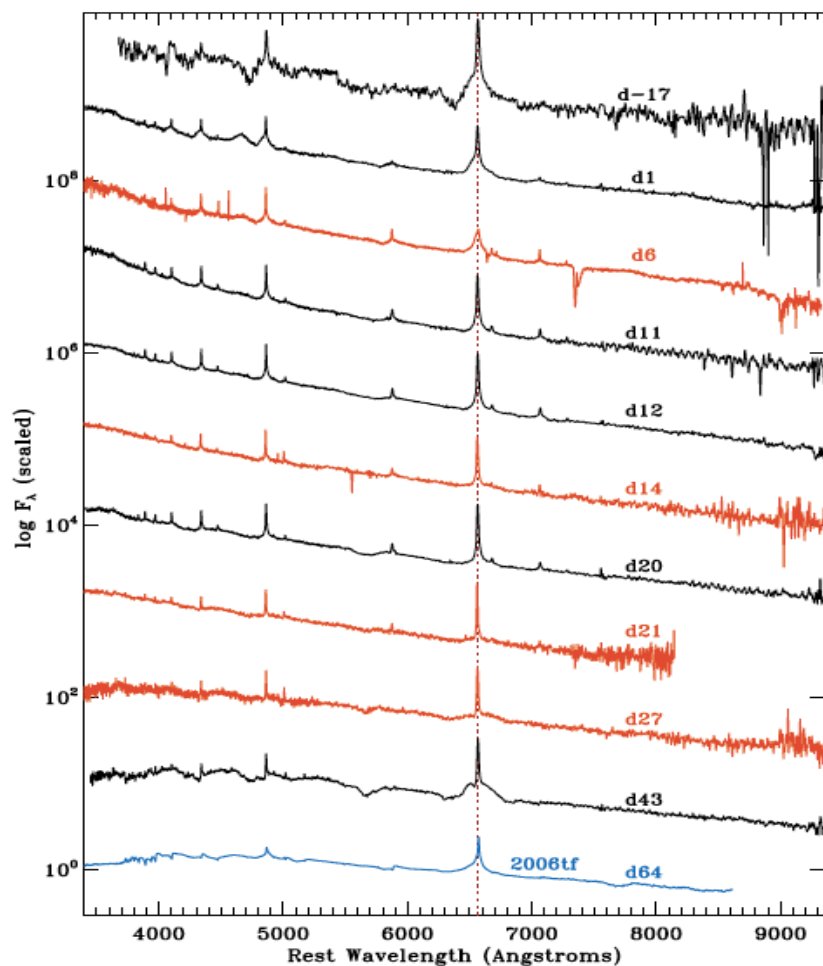
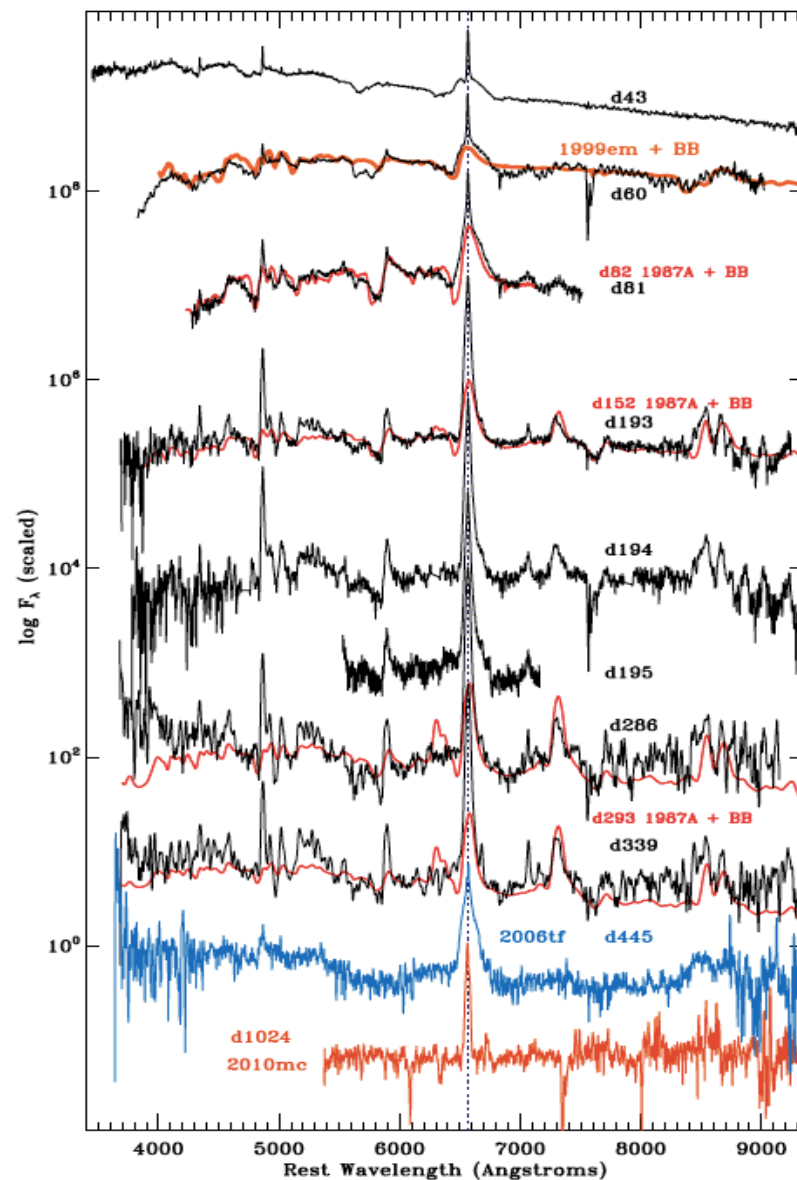


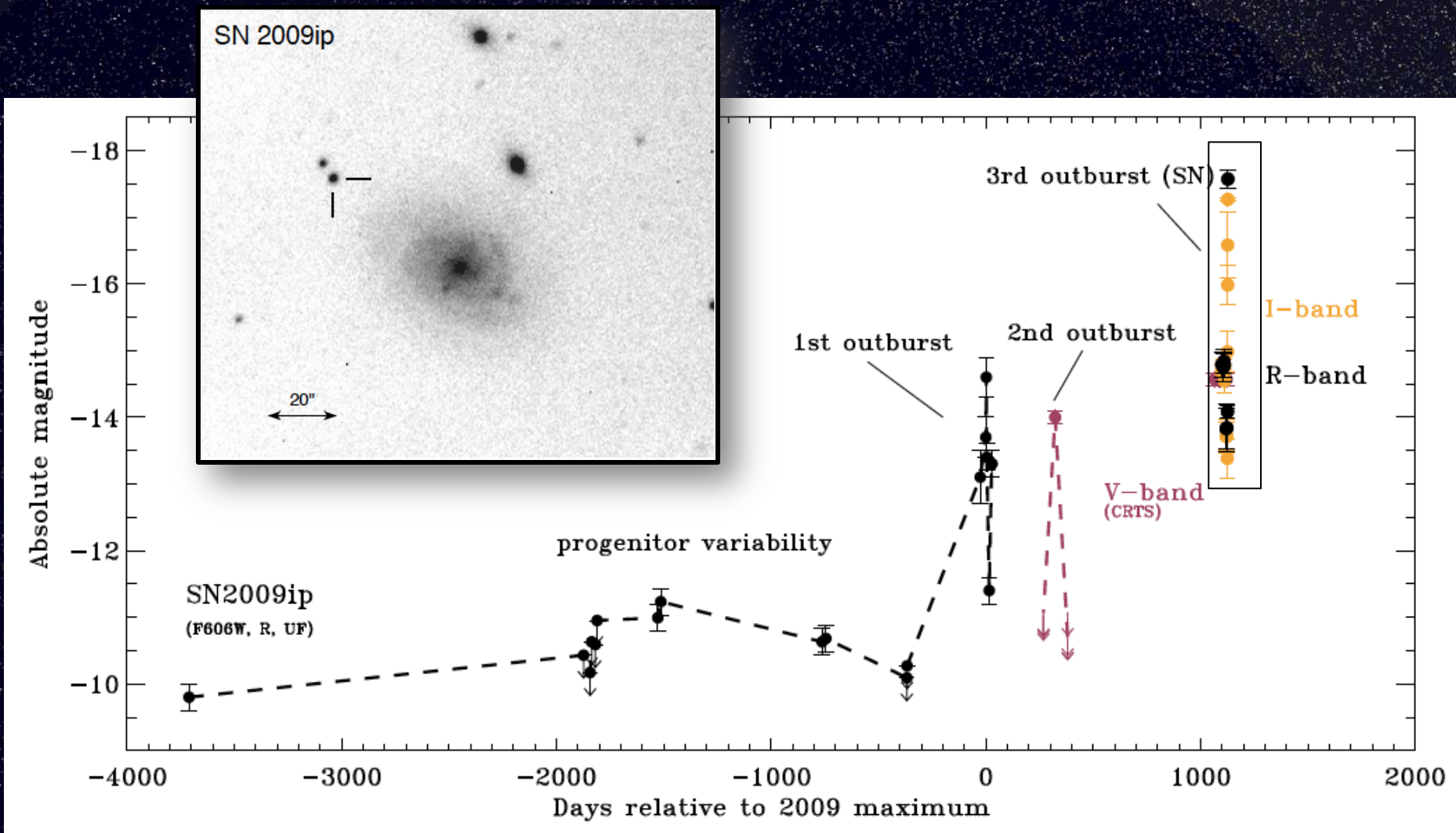
Figure 3. Early-time spectral evolution of SN 2009ip (black) and SN 2010mc (orange). All spectra here have been previously published, but have not been compared to one another. SN 2009ip spectra are from Mauerhan et al. (2013a), SN 2010mc spectra are from Ofek et al. (2013a) and the spectrum of SN 2006tf (blue) is from Smith et al. (2008).



We observed SN 2009ip in spectroscopic mode using IMACS at

Example: SN 2009ip

(Smith et al. 2009, 2013, 2014, 2016; Mauerhan et al. 2013, 2014)



Explosive Transient Followup

Basic NEEDS from ARTN (always single object, small FOV):

- UBVRI photometry: **Shallow $m < 19$ mag, daily cadence**
- UBVRI photometry: **Deeper ($m = 19-21$ mag), weekly-ish cadence**
- Low-res SLIT spectroscopy: **Shallow $m < 17$ mag, daily cadence**
- Low-res SLIT spectroscopy: **Shallow $m = 17-20$ mag, weekly cadence**

Deeper late-time photometry & spectroscopy, higher res spectroscopy as needed: **Classical observations**

DESIRES / Future needs:

- UBVRI photometry: **Same as above, but faster (multiple observations in one night, on occasion for special targets)**
- Low-res SLIT spectroscopy: **Quasi simultaneous (same night)**
- Pipeline reduction: **Ability to see reduced spectrum immediately**
- Spectropolarimetry: **Same night**
- IR photometry & Low-res SLIT spectroscopy: **In some cases as needed**