The SED Machine
+ GEONIS

P48

P60
(SEDM Here)
Metric = \((\text{acquisition efficiency}) \times \text{(calibration efficiency)} \times \text{(instrument efficiency)}\)

We aim to classify thousands of transients / year!
Rainbow camera imager: calibration + acquisition

$6.5'$

$g \sim 40\%$

$u \sim 8\%$

$i \sim 30\%$

$\tau \sim 45\%$
Rainbow camera imager

Unvignetted
Ø 17' circle

6.5'

\[
g \sim 40\%
\]

\[
u \sim 8\%
\]

\[
i \sim 30\%
\]

\[
t \sim 45\%
\]
PSI - 14XX W/ SUPERFIT
R~16 IN 1 H
r~19.7 in 40 m
r~19.9 in 1 h
GEONIS ON GEMINI

- Geonis is a workhorse instrument for Gemini 8-m.
- Optical and IR spectrograph + imagers
- Science takes advantage of Gemini’s unparalleled strength in queue based observing
  - Exoplanetology
  - NEOs
  - Transients
EMCCDS: NEXT BIG THING?

• Geonis will achieve a wide range of resolutions, using fast-readout low-noise EMCCDs + clever software.

• Gemini can deliver photons and not exposure time.

• Can perform discovery and diagnosis with one setup!
SUMMARY

• The rich variety of phenomena discovered by this range of surveys needs a variety of followup instruments.

• I presented two instruments, that span a huge range of space:
  
  • SED Machine- ultra-low resolution (R~100) IFU for a 1.5-m queue-based telescope.

  • GEONIS- Software-selectable resolution single-object spectrograph for 8-m queue-based telescope.
BACKUP
Hyperspectral imaging
spectrograph

Spectrograph

Lenslet Array

Expander Lens
To classify with a single observation, R=100 is sufficient.
Palomar 60" Focal Plane

Unvignetted Field:
ø18.1'

P60 Scale: 64.7 µ/as

IFU: 30''

12.8' x 12.8' FOV
Hyperspectral imaging spectrograph

Spectrograph

Lenslet Array

Expander Lens
Gemini 8-m Telescope

Acq/Gui/WFS

ADC

reflective collimator

6 dof actuator

dichroic

sillmask exchanger

Double pass prism

mirror in/out

Mode changer

lowres mirror

highres grating

single pass prism

in/out

red camera

Mode changer

lowres mirror

highres grating

single pass prism

in/out

nir camera