SEDM Overview & Operations

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Outline of SEDM Session

1. Overview of status and operations – Don Neill

2. Hardware status and plans – Michael Feeney

3. Pipeline upgrade – Mickael Rigault

4. SEDM database and website – Nadia Blagorodnova

5. Partnership time allocation – Ariel Goobar

SEDM Overview/Status

- P60 robotically controlled
- micro-lens array (MLA) IFU spectrograph with 28" FOV
- 4-filter (ugri) imager (4 x 6.5') for acquisition, guiding, photometry
- Time allocation: 65% – Partnership, 35% – Caltech TAC
- Currently ~10 science objects/night
  - 45 – 60 min per target + overhead
- Scheduler receives requests from GROWTH marshal
- Data reduced and available at Caltech (pharos.caltech.edu)
- Auto upload spectra to marshal next day
- Paper out: Blagorodnova, Neill, Walters, et al. 2018, *PASP*, **130**, 035003

SED Machine

Status

P60:   UP

SEDM: UP

IFU: UP

RCAM: UP

Obstruction cleared

Navigation

1. Introduction
2. Observer's Reference
3. SEDM Pipeline
4. Efficiency
5. Hardware
6. Components
7. Historical Documents

Quick search

Go

Welcome to SED Machine's documentation!

The SED Machine is very low resolution ($\frac{\lambda}{\Delta\lambda} \sim 100$) optical (365 - 1,000 nm) integral field (30"x"30") spectrograph and a rainbow imager with a 13' x 13' field. The rainbow camera images are partitioned into u, g, r, and i bands, each with a 6' x 6' field of view. The instrument was designed for rapid classification of supernovae from transient surveys. To achieve this goal, the instrument was designed to have:

- Low resolution ($R = \frac{\lambda}{\Delta\lambda} \sim 100$), sufficient for classification.
- High "Slit to detector" photon throughput.
- 0.1 mag precision spectrophotometry.

The hardware project was funded by the NSF with a grant to Caltech. Many people were involved. Current members of the team are:

- Michael Feeney (Instrument Master)
- Richard Walters (Telescope/Instrument Operations and Scheduling)
- Don Neill (Commissioning Scientist, IFU pipeline)
- Nadejda Blagorodnova (Science results, RCam photometry pipeline)
- Chris Cannella (Marshal interface, ATels)
- Jamey Eriksen (Operations Support at Palomar)
- Jeff Zolkower (Operations Support at Palomar)

Former members, some of whom are still consulted for advice are:

- Nick Konidaris (Principle Investigator)
- Robert Quimby (Project Scientist)
- Jack Davis, and Sagi Ben-Ami (Weizmann institute grad students)
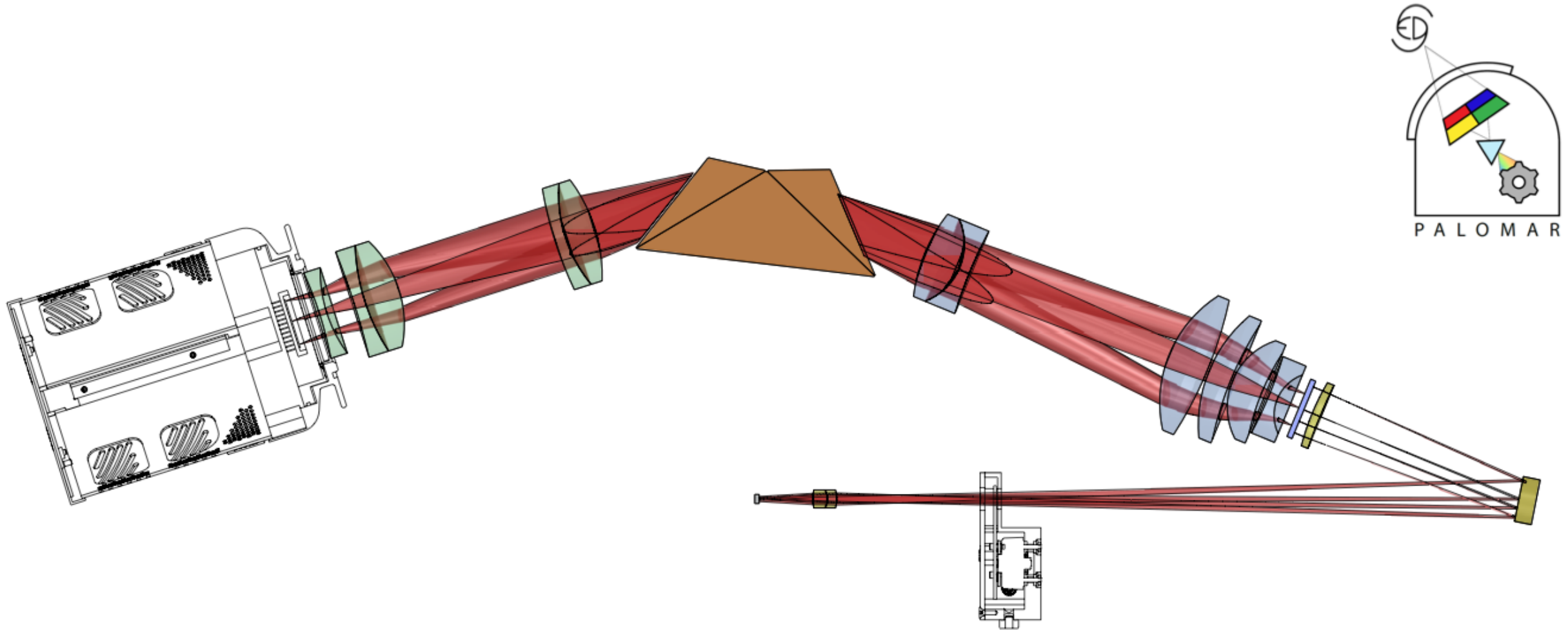- Karl Vyhmeister (SEDM Database)

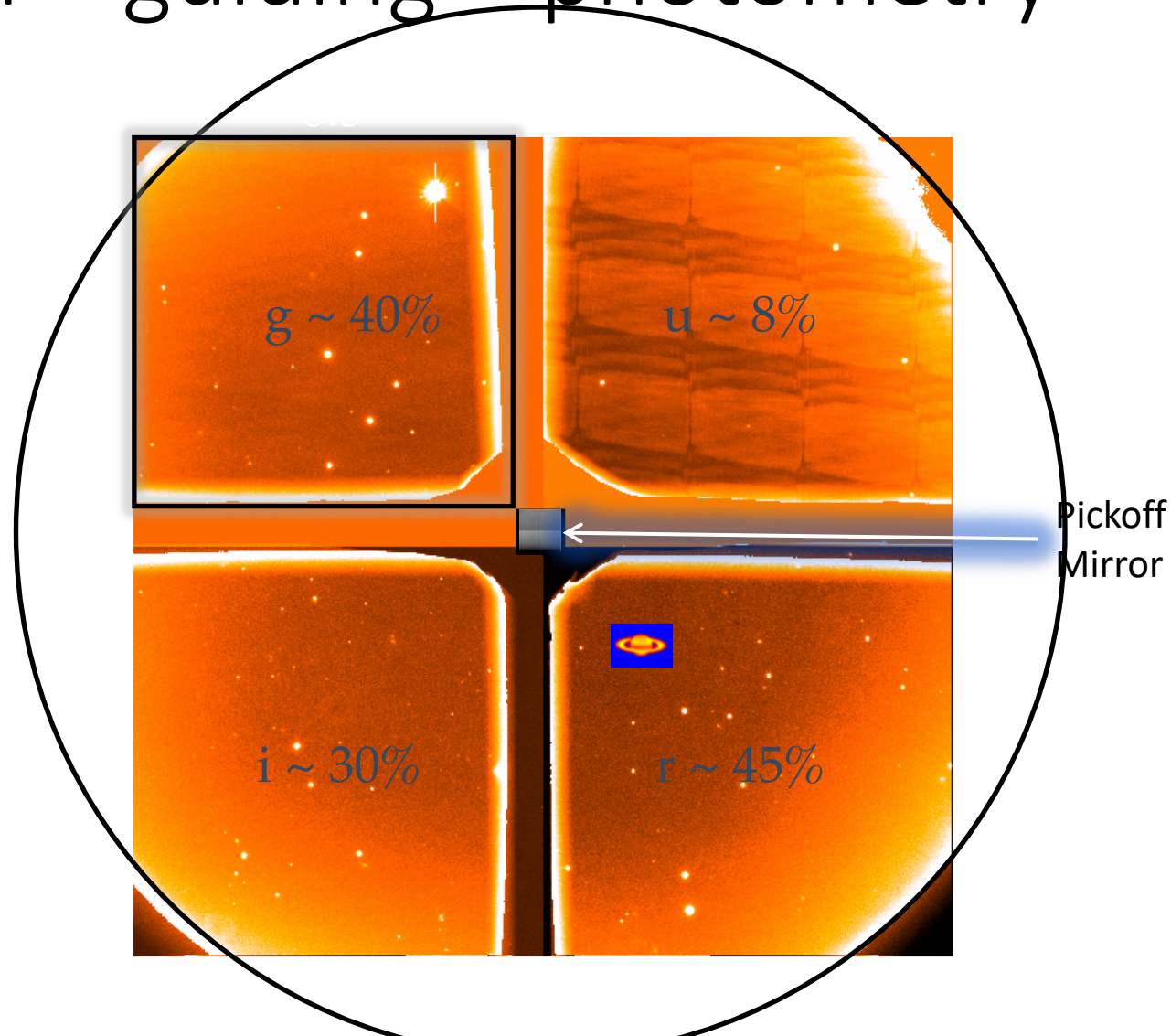Here we document the instrument for observers and developers. Observers will want to refer to

Also:
pharos.caltech.edu
(Nadia's talk)

Facility instrument on P60

Hyperspectral Imaging Spectrograph

Rainbow camera (RCam) imager: acquisition + guiding + photometry

g ~ 40%

u ~ 8%

i ~ 30%

r ~ 45%

Pickoff Mirror

Plans

- Hardware upgrade (see M. Feeney talk)
  - New micro-lens array
  - Improved environment control
- Improved DRP (see M. Rigault talk)
  - Automated
  - New shutter on Rainbow cam (installed and tested!)
  - Astrometry from sum of guide images
  - Forced PSF spectrophotometry at automatically placed position

SEDM as Resource

- Small operations software team: 3 people (all part-time)
- Small hardware team: 1 – Caltech + Palomar staff (all part-time)
- Cannot provide optimized facility
- All inputs/discussion of updates through instrument scientist (DN)
- Partnership / Caltech must take lead in management of their share

SEDM Team Responsibilities

- Manage instrument hardware (see M. Feeney talk)
  - In spite of hardware issues, SEDM has been on sky throughout commissioning
- Provide operational framework (Richard Walters)
  - Basic automated scheduling (discussed here)
  - TOO facility
  - Accounting of time used (see N. Blagorodnova talk)
- Data reduction (see M. Rigault talk)
- Access to reduced data (see N. Blagorodnova talk)

Partnership / COO Responsibilities

- Manage observation priorities
- Manage distribution among sub-programs
- Final disbursement of data
- Final classifications

SEDM Scheduling (part 1)

- Partnership & COO supply targets on a nightly basis with their own assigned priorities, program name (SWG)
  - expect partnership & COO to provide backup/bad weather/heap programs
- The requests are automatically scheduled, using 15 minute block schedule methodology (discussed in Goobar committee, see his talk)
- The SEDM Robot executes the schedule according to:
  1. Time block (Partnership or COO)
  2. Priority
  3. First setting (HA, and < 2.5 airmass and end, and > 30 deg. from moon)
- TOOs interrupt schedule

SEDM Scheduling (part 2)

- Partnership & COO each will appoint "SEDM Czar"
- Czar will view object visibility/schedule on SEDM web page.
- Czar can shuffle objects within the time block through marshal by updating priorities
- SEDM team will provide a usage summary on nightly / weekly / monthly / semester cadence
- SWGs will have access to these reports
- SEDM Czars are expected to mediate within each community

Looking forward to…

- Improved throughput
  - new MLA in April
- Automated pipeline
  - I get to sleep late
- Forced PSF photometry and better scattered light subtraction
  - No more A/B -> reduced overhead
  - Possibly shorter exposure times (trade with PSF star obs: Std Stars)
- Smooth scheduling and operations
- Better weather!!!