

Variables in SNLS

Kathy Perrett (Toronto) + SNLS

– Presented by Andy Howell (Toronto)

Survey Design

- Megacam (1 sq. deg.) on CFHT
- Four fields (2 at any one time)
- Rolling search
- g'r'i'z' (some u*) every 4th day during dark time
- Five years (ends August 2008)

Candidates

In 43 months...

Total unique candidates: 4777

SN: 1622 (294 Ia / 47 II / 12 Ib/c)

AGN: 549

var: 1134

SMO: 346

PSFM: ~1000

By end of survey...

~1000 SNe Ia (500 confirmed w/spectra)

~1000 CC SNe (100+ confirmed w/spectra)

?? AGN and variables

SNLS Database

SNLS Spectroscopy Admin - Windows Internet Explorer
 https://legacy.astro.utoronto.ca:9443/Spectroscopy.php
 Certificate Error
 Google
 SNLS Spectroscopy Admin

SuperNova Legacy Survey (SNLS) Detection Database

Internal Website

Public Website Home Candidates Spectra Downloads Finders Follow-up Forum ObsLog Schedule Share SNLSObs Weather
 Edit Dets Edit Spec Add Dets Add Phot Follow-ups Admin

Add/Edit Spectroscopy

Keyword Search RA (hh:mm:ss.s) DEC (-dd:mm:ss.s) List Objects Field Show
 Follow-up candidates All Deep 20 Go! Reset

(Reset restores the default settings.)

- Add new entry
- Add new epoch
- Name server

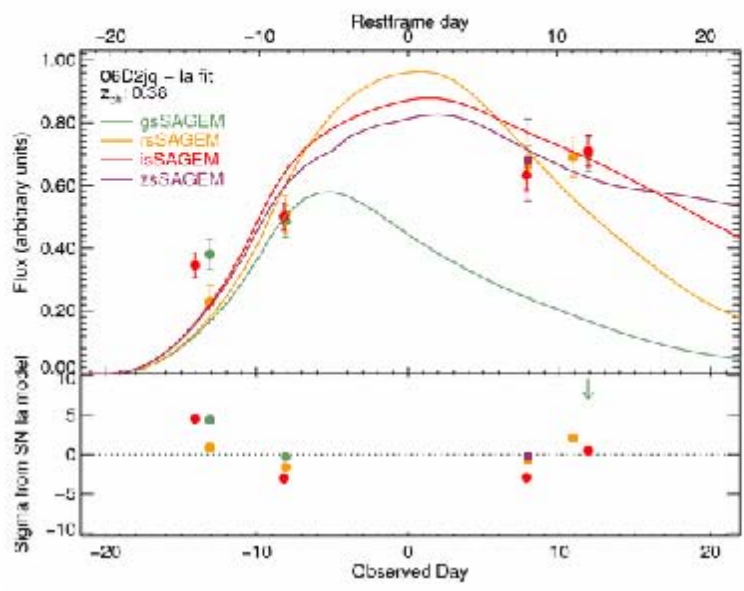
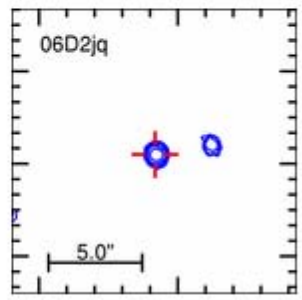
Print summary of selected objects in simple text format - (with RTA phot)

(Showing entries 1 - 20 of 103)

Next> End>>

Action	Name QRunID	Field Cdn ID French ID	RA Dec CCD (xmos,ymos)	Offset from Host Host i', Stel	i'(AB) mag [UT date] %inc	Type [Index] Photo-z Est age (obs)	SpType [HI] Spec-z Ref Spec (Other Spec)	Follow-up alloc/done	Links	LC Status	Spec Rank
Edit Det Edit Spec Follow-ups Comment Delete	07D2fi 07AQ05	D2 c070419-12	09:59:11.839 +02:12:40.32 06 (16186,10105)	0.03"W, 0.14"S Tot=0.14" PA=192.1 i'=21.0, St=0.2	↑ 24.00 ± 0.07 [2007-04-19] 10% PZ LC Dets ACS Phot	SN? (est. z=0.39) -6 days			Finder Images Photo-z	1	
Edit Det Edit Spec Follow-ups Comment	07D2et 07AQ05	D2 c070415-34	10:02:03.862 +02:40:42.01 01 (2326,19147)	0.13"E, 0.30"S Tot=0.33" PA=155.8	↑ 24.15 ± 0.06 [2007-04-19] 49% PZ LC Dets ACS Phot	SN? (est. z=0.96) -5 days			Finder Images Photo-z	1	D

SNLS
real
time

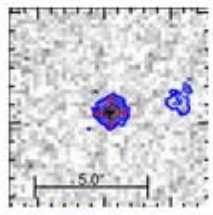


User Comments on 06D2jq
(add comment)

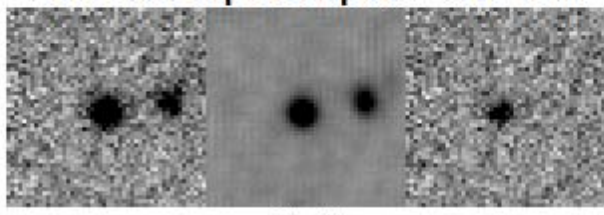
Click the images below to obtain a larger view

Show all detsnaps

Detection Triplets: Epoch - Ref = Diff

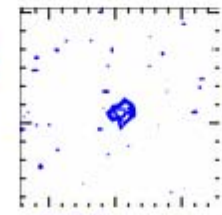


SN+host



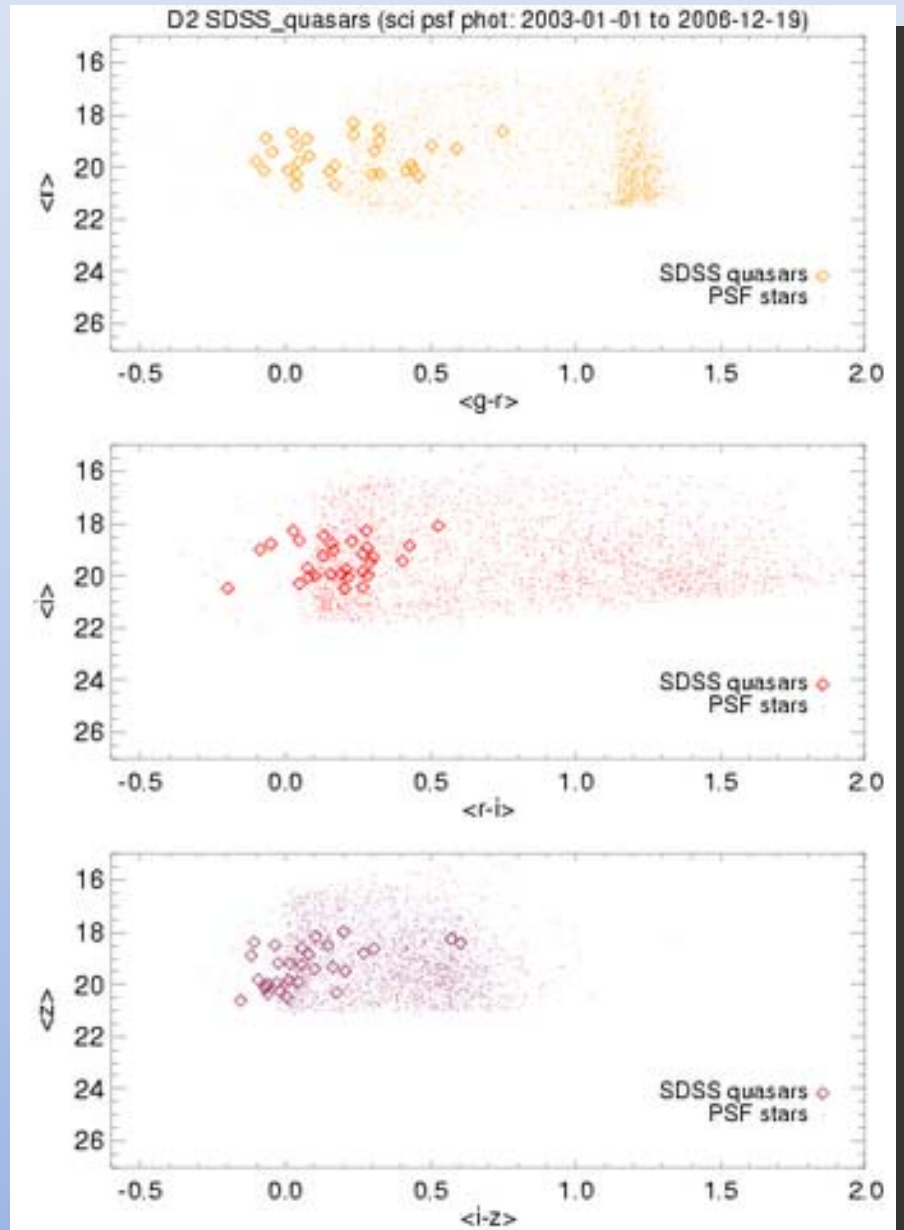
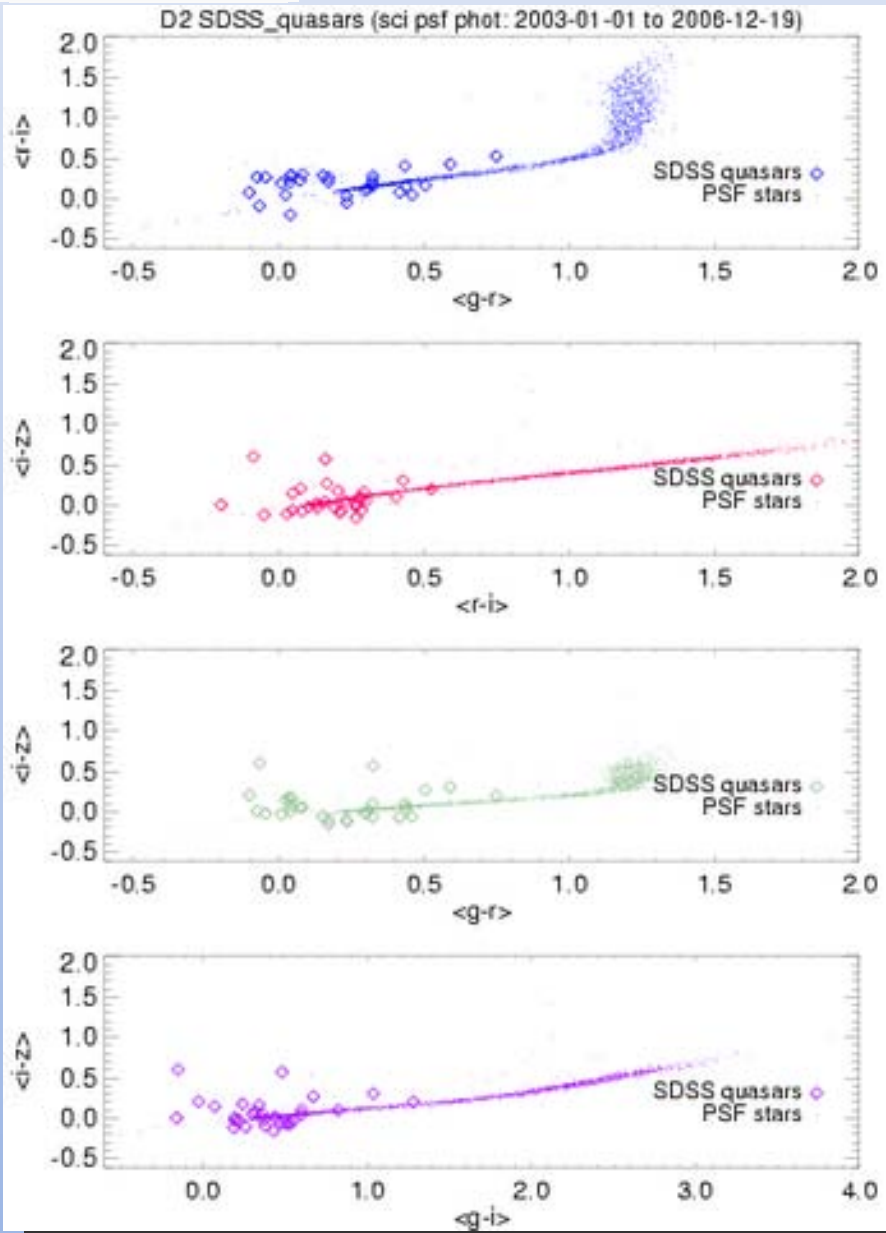
(9"x9")

Discovery epoch
2006-12-17
 $i' = 23.63 \pm 0.04$
53% inc, 2160 sec
Flux: 3763.5 ± 150



Diff Contours

AGN



Variability Index

2. IDENTIFYING CANDIDATE VARIABLES

The Welch/Stetson variability index I is defined by the equation

$$I = \sqrt{\frac{1}{n(n-1)} \sum_{i=1}^n \left(\frac{b_i - \bar{b}}{\sigma_{b,i}} \right) \left(\frac{v_i - \bar{v}}{\sigma_{v,i}} \right)},$$

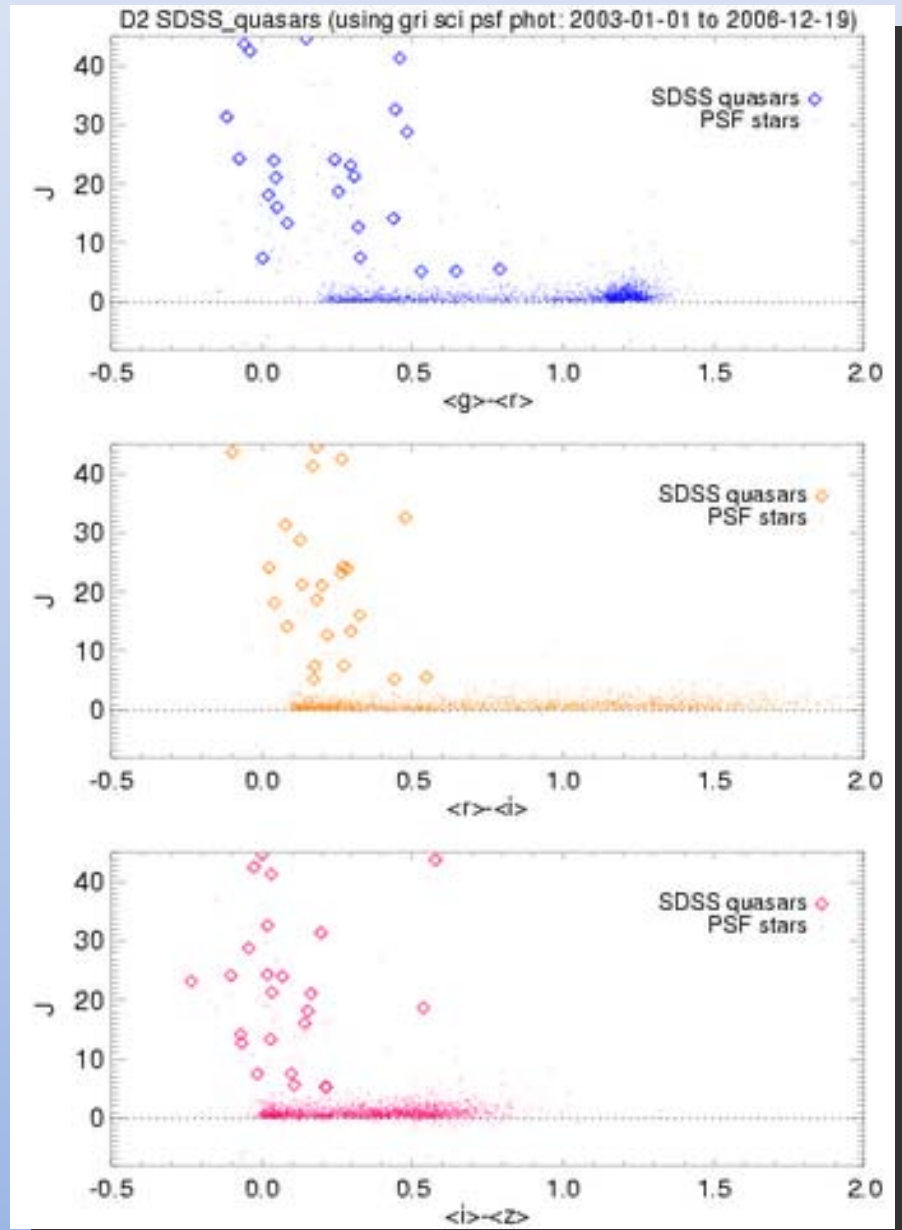
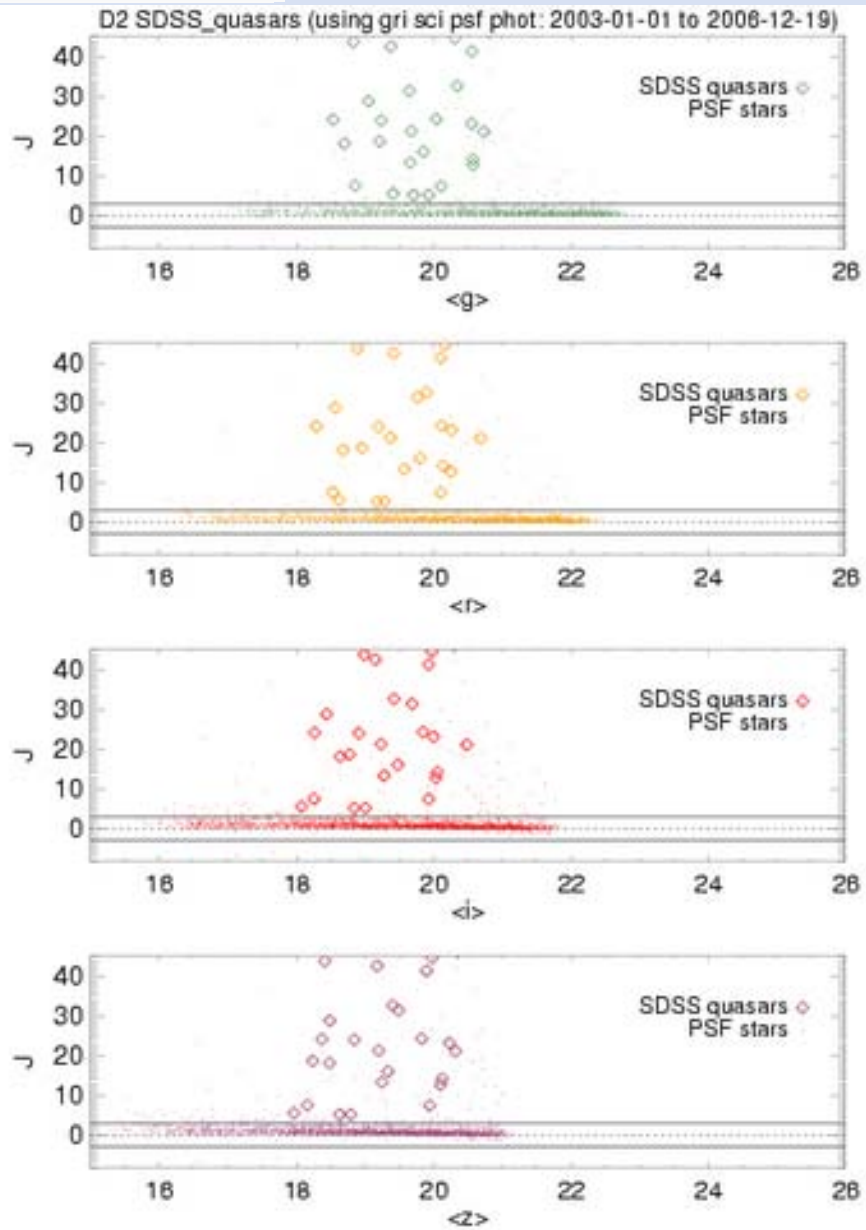
where b_i and v_i are the apparent magnitudes obtained for the candidate star in two observations closely spaced in time on some occasion i , $\sigma_{b,i}$ and $\sigma_{v,i}$ are the standard errors of those magnitudes, \bar{b} and \bar{v} are the weighted mean magnitudes in the two filters, and n is the number of observation pairs. This notation is rooted in the assumption that on each

Welch & Stetson 1993

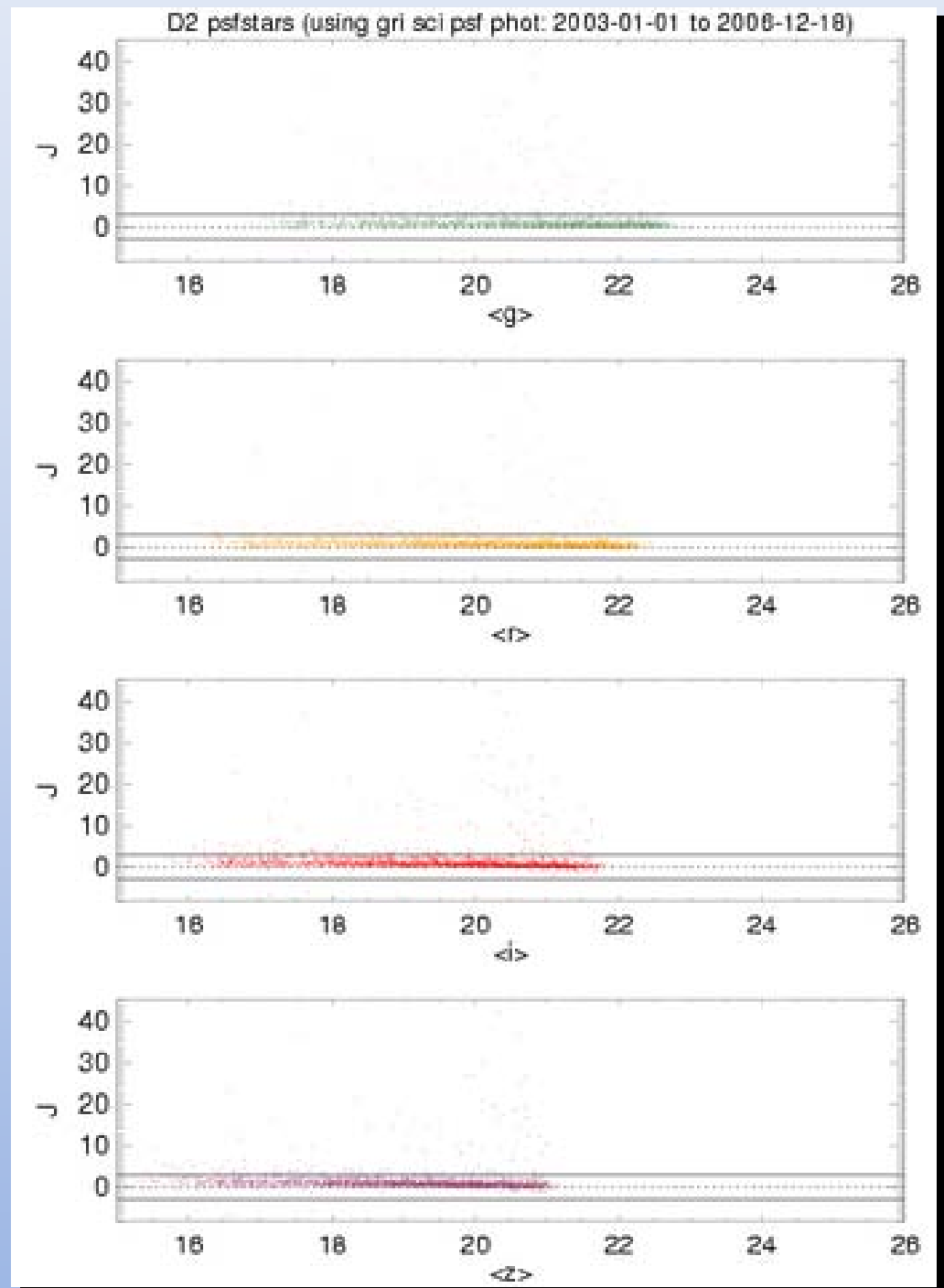
Stetson 1996

- Measures correlation in magnitude offsets for successive measurements in multiple filters for a given epoch
- Positive if offsets are correlated and significant compared to errors
- J is similar, but more robust to bad measurements
- Star deemed variable if $J > 2.5$

AGN



Tertiary standards

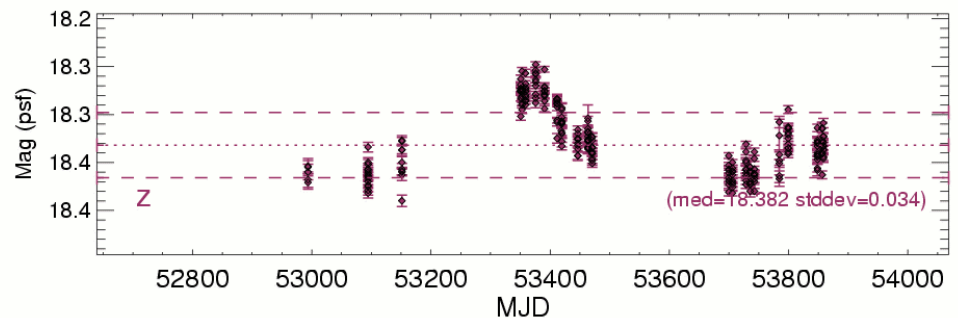
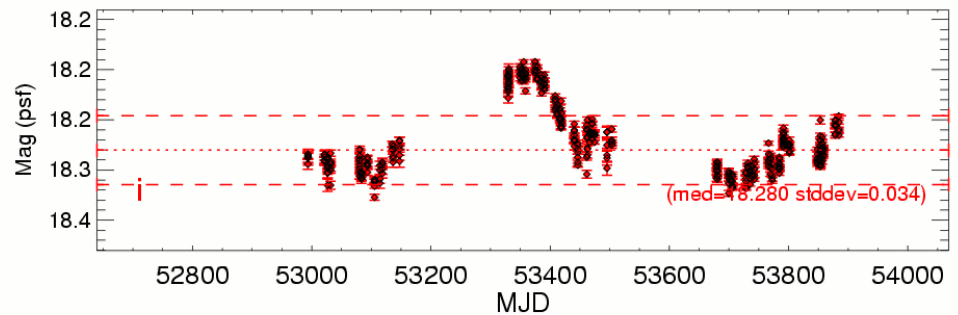
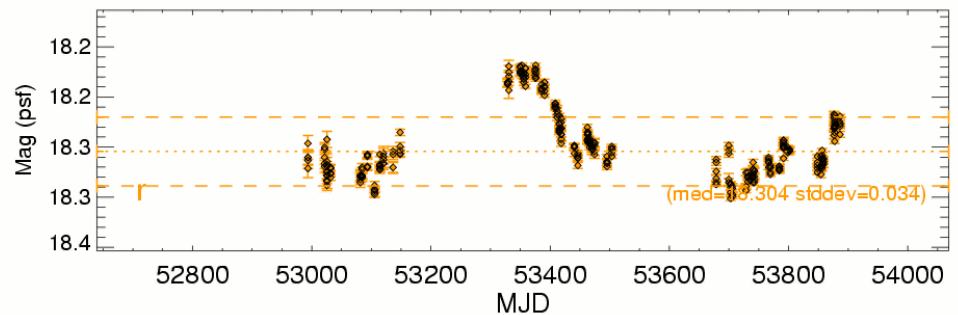
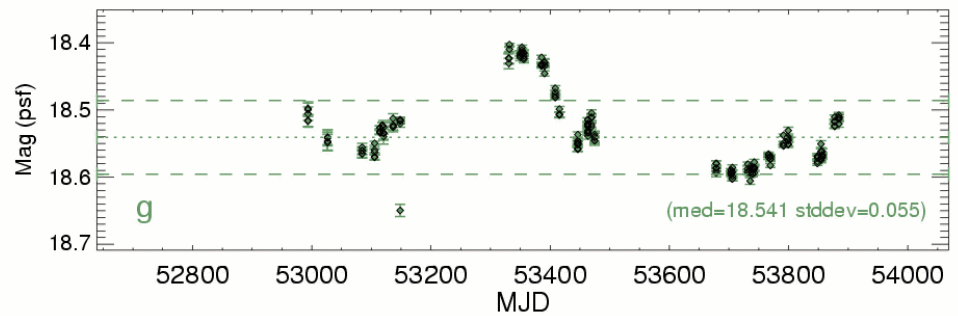


Example variable star 1

Final PSF photometry

No image subtraction

J=24.2

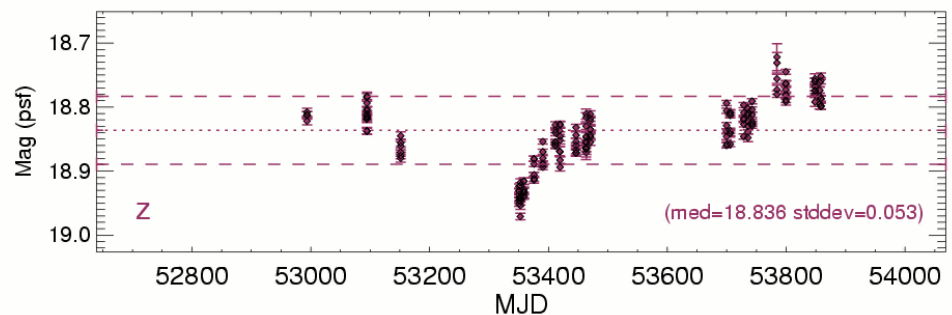
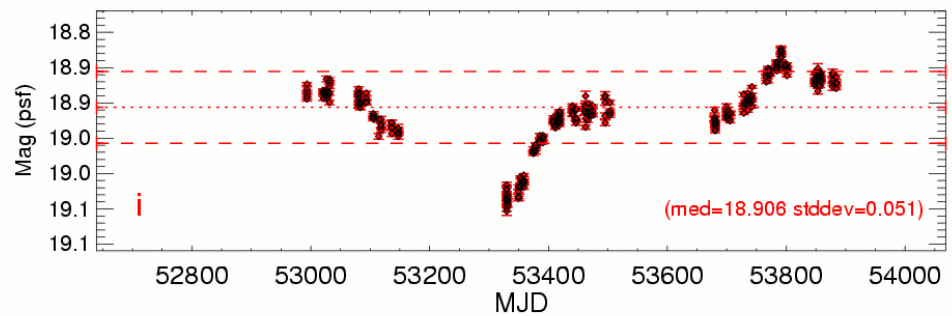
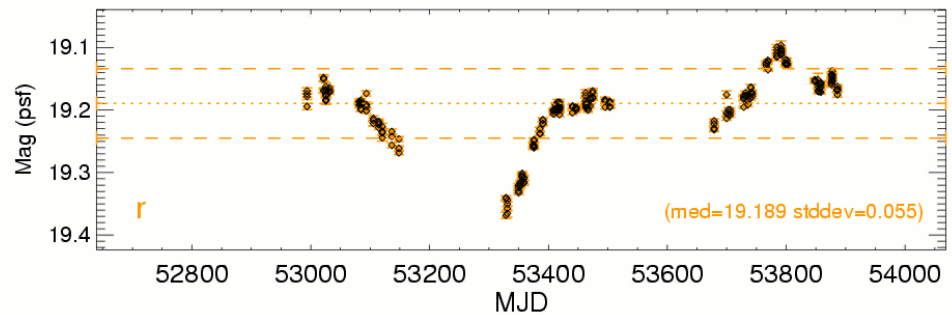
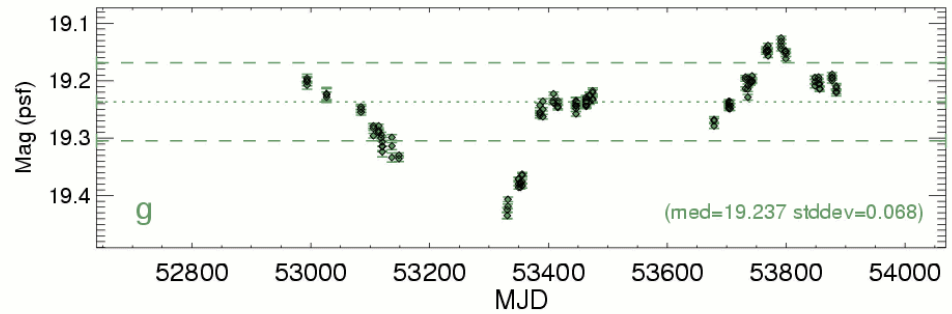


Example variable star 2

Final PSF photometry

No image subtraction

J=23.8

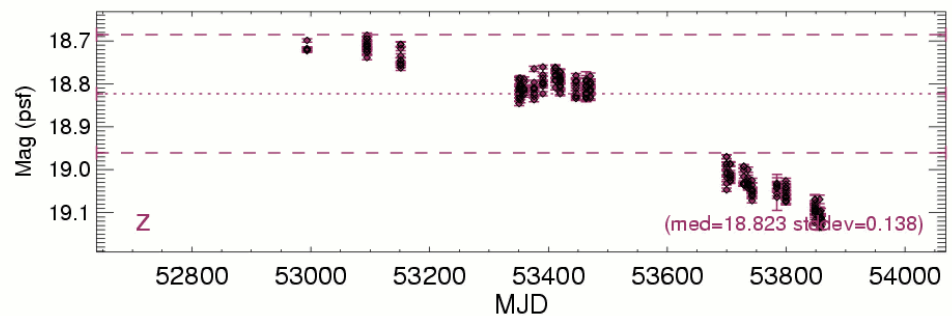
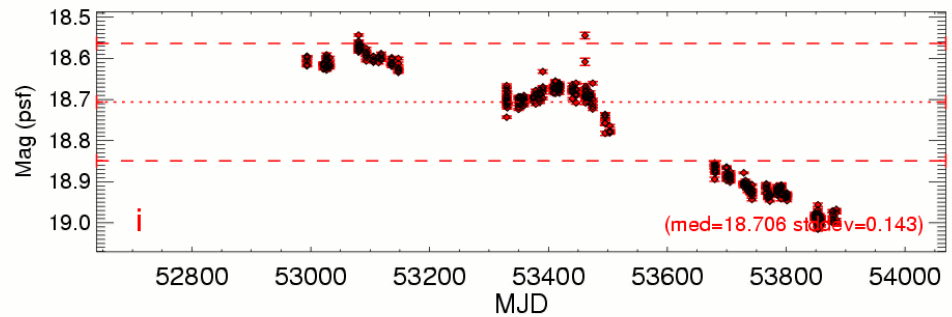
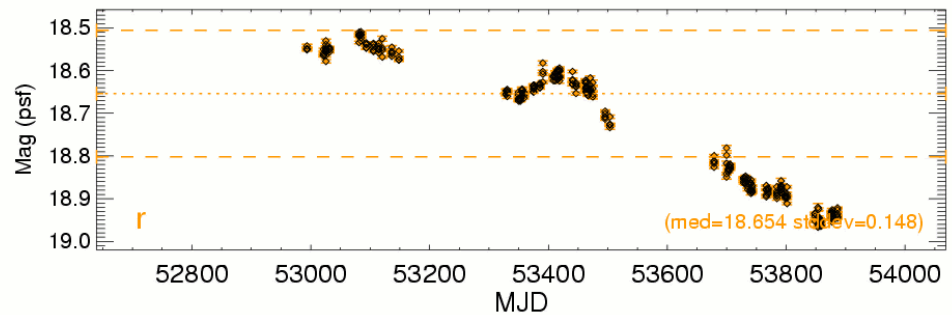
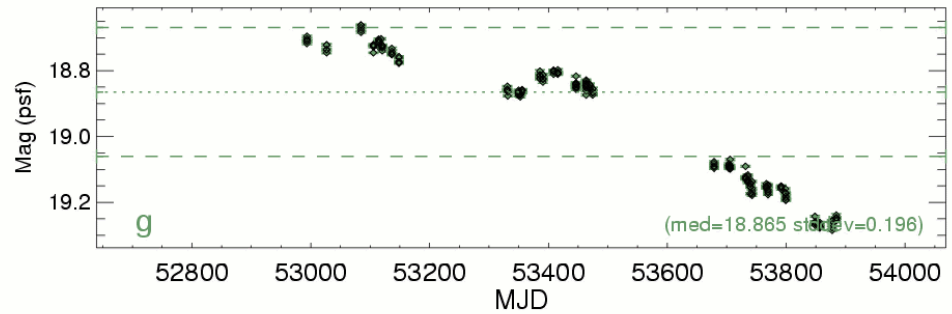


Example variable star 3

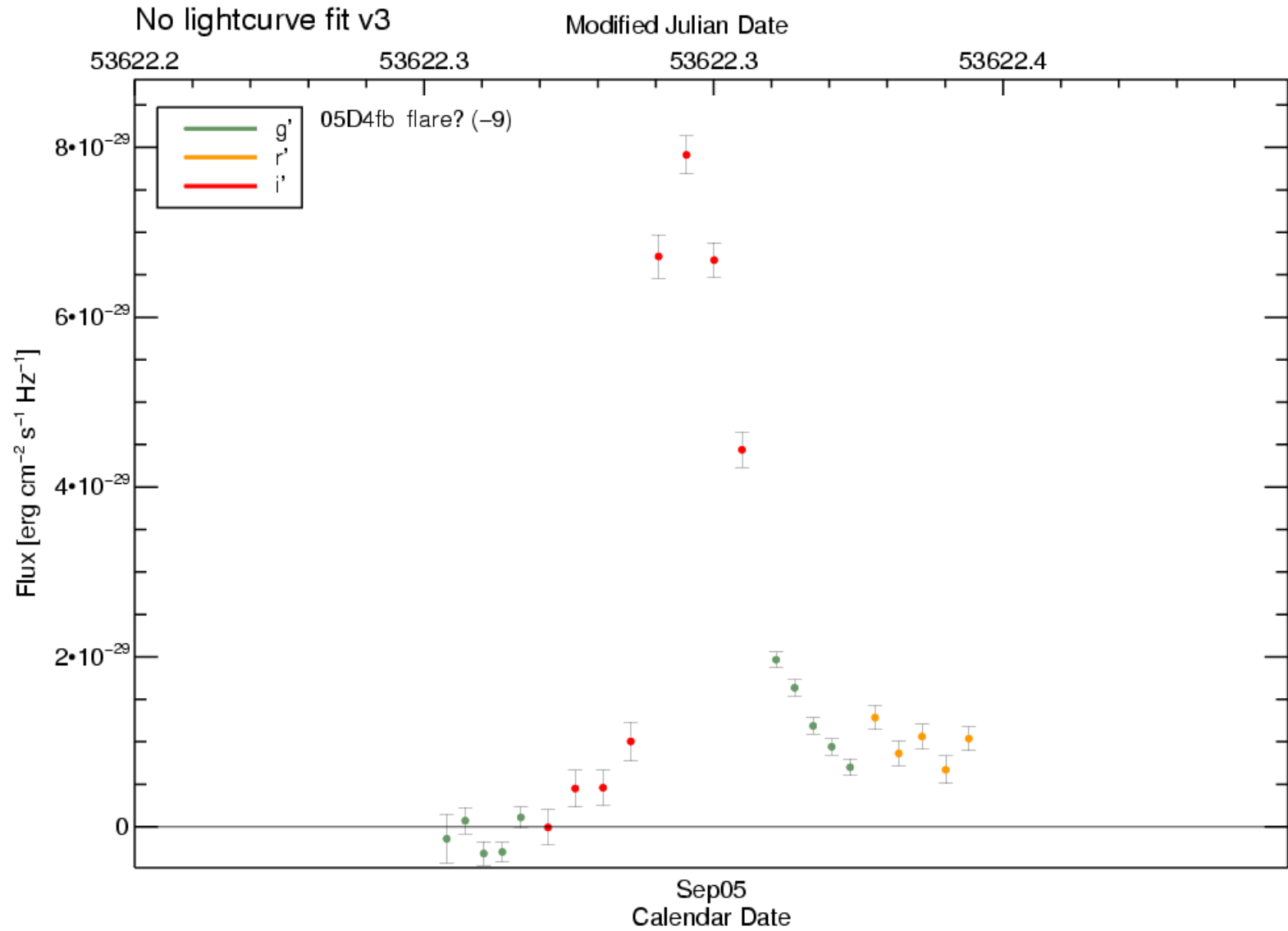
Final PSF photometry

No image subtraction

J=124.8



Flare Star



Questions

- What are expected number of interesting variables in 4 square degrees?
- Colors?
- How do we alert people?