# Transient Mapping

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## DATA COLLECTION

$l^{II} = 202°...\ b^{II} = \pm 5$

| | $b = (0)$ min | $b = (0)$ max | $b = (1)$ min | $b = (1)$ max |
|---|---|---|---|---|
| RA (no offset) | 93° | +108° | +102° | +117° |
| Dec (no offset) | -20° | +8° | -15° | +12° |
| RA (offset) | +93° | +108° | +102° | +117° |
| Dec (offset) | -20° | +8° | -15° | +12° |

## DATA REDUCTION

- Sorted data by going through 1deg x 1deg FOV
- Identify stars as most variable
- Run LS
- Discuss how we established uncertainty in period - how this propagates to distance calculations
- How are we going to determine distance - discuss PL-relation

## What JT Did For Newly Sorted/Reduced Data

### Sorting Pattern

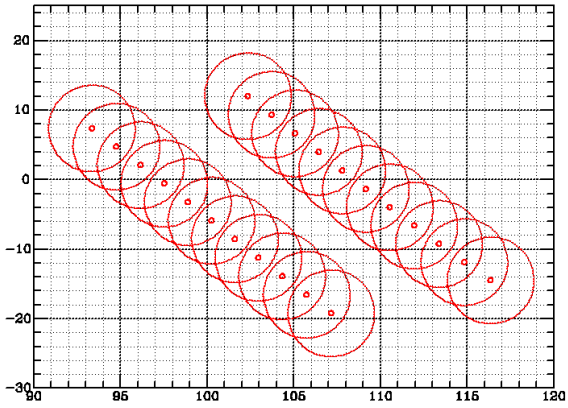



FIG. 1: *Stars were grouped in the pattern shown (down the collected observations)*

- split observations into 1 $deg^2$ chunks
- isolated groups s.t. each one is a star with 12 or more obs
- −− more than 12 detections to be a star
- −− any sq deg that has more than one star
- this reduced 1300 $deg^2$ observation data down to 300
- for variability parameters
- −− log(average(upper quartile)) - log(average(lower quartile))
- −− expect variation to go at .2* mag (from sqrt noise)...so subtract .2mag to get the logritmic statistic
- sorted biggest (most variable?) to smallest (least variable?)
- ran LS on 80,000 most variable stars, rather than full star groupings (over 1million)

### LS

- major aliasing at 1 day and 0.5 day periods
- things that fall at at -50 (in Figure 2) means that those are VERY probably variable stars
- roughly _____ stars fell at -50 in Figure 2
- 80,000 stars tested for variability
- other stars (outside of 80000) are statistically unlikely to be variable

### prob(f)

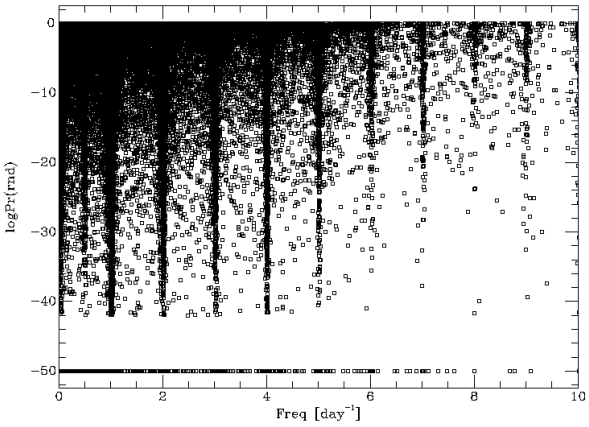



FIG. 2: *prob(f) of 80,000, most variable, stars LS was run on*

## ANALYSIS

### Pan-STARRS Comparison

- download Pan-STARRS data (finished)
- compare generated variable star list to PS RA and Dec
- validate observed variable stars
- Determine if PS parameters are worth anything (are candidates actually RR Lyraes)

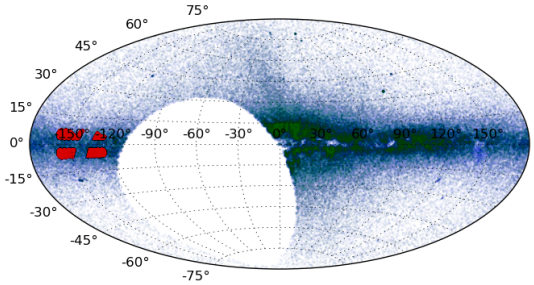


FIG. 3: *Aitoff projection of observed and PS RR Lyrae candidates. Blue are candidates from PS that ¿= 0.05, green are PS candidates that ¿= 0.2., observed data in red.*

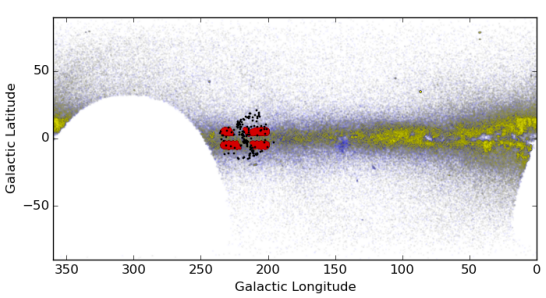
### Simbad Completeness

- Pull established RR list from Simbad
- Pull other variable data from simbad, too
- Compare list of observed RR to catalogs
- Is anyone actually reading this outline, this bullet point serves no purpose
- Wow, its sad how little Jeff did since class began (especially after JT gave him the code to do it a month ago) - 6 obs x 4 nights = January-April work period haha
- Establish completeness with Simbad

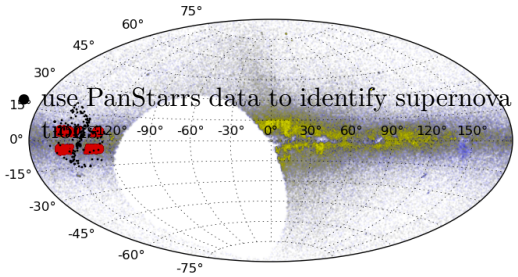
### 3D map galaxy - var. stars

- Use gri data to identify variable stars
- Use Period-Luminosity relationship to get distance
- Map 3D spatial distribution
- Determine deviation of variable stars from model
- Variations arise from non-gravitational effects
- Figure out dark matter distribution

## CONFIRM ACCELERATED EXPANSION - SUPER NOVEA




(a) *Aitoff map.*




(b) *Aitoff projection*

FIG. 4: *Aitoff projection of observed and PS RR Lyrae candidates. Blue are candidates from PS that ¿= 0.05, yellow are PS candidates that ¿= 0.2., observed data in red, simbad in black.*

- use PanStarrs data to identify supernova loca-

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† Observational Astronomy 301