Observing Strategy

F275W  F336W  F475W  F814W  F110W  F160W

\[ \text{F}_\lambda, S_\lambda, \text{Sun}, \text{Vega}, \text{M5III} \]
Likely completion: September 2013

Dustin Lang
Major Spectroscopic Campaigns

• Keck DEIMOS  (stellar kinematics & spectral typing: Guhathakurta, Dorman, Kalirai, & Howley)

• MMT Hectospec  (clusters, PNe: Caldwell)

• Palomar/MMT  (HII regions: Skillman, Berg, Kirby)

• Keck MOSFIRE  (metal-rich bulge giants: Kirby)

• LBT MODS  (hot stars: Collins, Rix, Weisz)
DEIMOS Campaign

Oct 2010
Selected from CFHT data
RGB dominated

Sept 2012
Selected from HST data
All spectral types
An Example
Major Multi-Wavelength Campaigns

- **EVLA** (radio continuum & 21 cm: A. Leroy, D. Weisz)
- **Herschel** (complete imaging + targeted spectroscopy: MPIA, K. Sandstrom)
- **CARMA** (CO J=0-1: A. Leroy, A. Schruba)
Stats:

• 336 out of 414 fields
• 850 Gb of raw data
• >100 million stars
• 0.7 billion photometric measurements
We're on a collision course with the Andromeda Galaxy.
Help researchers understand the awesomeness of the Andromeda galaxy, because one day we'll be in it...
Science Highlights

- Survey paper (Dalcanton et al 2012)
- First cluster catalog paper (Johnson et al 2012)
- UV stars in bulge (Rosenfield et al 2012)
- Kinematics of the inner halo (Dorman et al 2012)
- Halo profile traced by blue HB stars (Williams et al 2012)
- Techniques for age dating semi-resolved clusters (Beerman et al 2012)
- Techniques for IMF fitting (Weisz et al 2012)
- SNR progenitor masses (Jennings et al 2012)
Blue Horizontal Branch
Stars as a Halo Tracer
BHB are a low metallicity tracer

GC’s from Dotter et al 2010
BHB’s detected to within 3 kpc of center

Halo Mass: \( \sim 2 \times 10^9 \, M_\odot \)

Requires profile break
Masses of SNR progenitors

59 SNR in M31 with HST coverage (most from PHAT)
Age of stars near SNR tell mass of evolving star

Red: Data     Grey: Model Star Formation History
Mass distribution steeper than Salpeter IMF
Constrains minimum explosion mass as well.
Primary Data Products

- Photometric catalogs for field-by-field photometry, with <0.005” relative astrometry.
- Multidrizzled reference images for each field.
- Multidrizzled brick-wide mosaics.
- Delivered ~9 months after observations complete (6 month intervals between releases)
## Data Releases

<table>
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<th>2011 Fall</th>
<th>2012 Spring</th>
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<tr>
<td><strong>4 Bricks</strong></td>
<td><strong>1 Brick</strong></td>
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<tr>
<td><strong>25M stars</strong></td>
<td><strong>5M stars</strong></td>
</tr>
<tr>
<td><strong>170M measurements</strong></td>
<td><strong>35M measurements</strong></td>
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- **Fall 2012**
  - 9 Bricks
  - 40M stars
  - 280M measurements

- **In progress:**
  - Photometry complete
  - UV + optical ready, but NIR distortion issues

**3 more complete bricks to be released in Spring 2013**
Technical challenges

- Switch to AstroDrizzle
- Implementation of 6 filter photometry
Simultaneous 6-filter photometry

- Uses full depth in overlaps.
- Star positions constrained by higher resolution and/or deeper data
Many more stars detected in NIR

Some improvement in UV as well
6 Filters = Memory Hog

- 237 chips from 163 exposures overlap each WFC3/IR pointing
- Needs 50 GB of memory to execute!
Technical challenges

- Switch to AstroDrizzle
- Implementation of 6 filter photometry
- Data Volume
Data Volume

• Will have ~1 Billion photometric measurements.
• Data management is a time sink
• Data access is challenging
• Data processing is expensive
• Optimization saves money but costs time
Impact of Budget Descopes?

• Won’t know until we optimize data processing

• Pursuing cost offsets (XSEDE, Teragrid, Amazon)
Even before de-scope

9/12
9/13
9/14

15% Budget Cut
Skeleton Crew

Data Acquisition Complete
50% of one research scientist

Risk: Insufficient time to do science with full data set
STScI Support

• **Databases!!!!**

  • UVIS CTE correction
  • New TinyTim PSF models (still desperately needed for WFC3!)
  • Higher priority to F475W calibration