

Progress toward the PanSTARRS Public Archive

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The PS1 public archive

- STScI will provide the public archive for PS1 data
- Planned services:
 - Catalog access
 - Simple form interface
 - Web services (including VO-compatible interfaces)
 - SQL query interface
 - Image access
 - Whole images
 - Image cutouts either as FITS files or JPEG previews
 - Interactive display
 - We will use products from the PS1 project with existing tools developed by MAST and PS1
- *NOTE: This is not a MAST-funded project!* It is supported by STScI science funding.

PS1 data @ STScI: Images

- Coadded stacked images and single-epoch warps
 - All PS1 surveys will be included:
 - 3PI (30,000 sq deg north of declination -30°)
 - Medium Deep Surveys (10 fields, 7 sq deg each)
 - North Celestial Pole, etc. ...
 - Images dominate total data volume (mainly 3PI, MDS)
 - Total data volume without difference images ~ 1.8 PB
 - Includes auxiliary images (wt, expwt, exp, mask, num)

PS1 data @ STScI: Catalogs

- Catalog databases
 - Including stack detections, single-epoch detections, forced photometry & objects (linking multiple epoch detections)
 - Total database volume ~100 TB
 - Most database volume is in single-epoch detections
 - 3PI database (PV2, not yet final version):
 - 60×10^9 detections
 - 8.4×10^9 objects
 - 2.3×10^9 objects with $n\text{Detections} > 1$
 - For comparison, SDSS DR9: 469 M objects (14,000 sq deg)

Catalog access interfaces

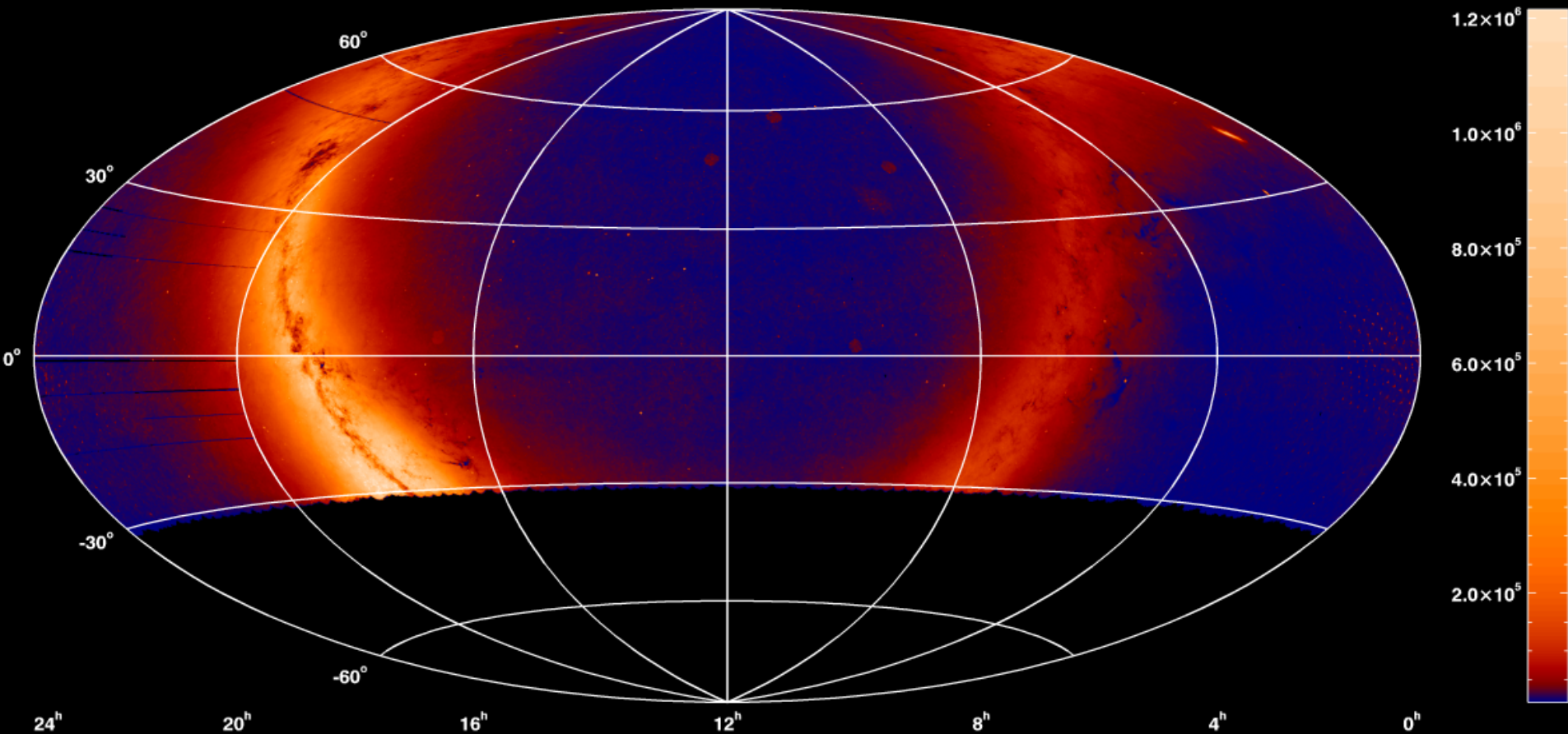
- CasJobs (or similar PSPS interface)
 - Both exist now at STScI using pre-release version of database
- Simple MAST forms interface
 - Will include the usual interfaces (including VO cone search) for scripting access
- MAST portal access
 - Similar to Hubble Source Catalog
- Overlay in HLA/MAST interactive display

Image access interfaces

- Image cutouts and downloads
 - Simple search by position or object name
 - Download FITS or JPEG cutouts or full images
 - Interactive image display in browser
- Image access in MAST portal
- TOAST/HEALPix projection
 - Create multi-resolution color image background suitable for use in MAST portal & other viewers

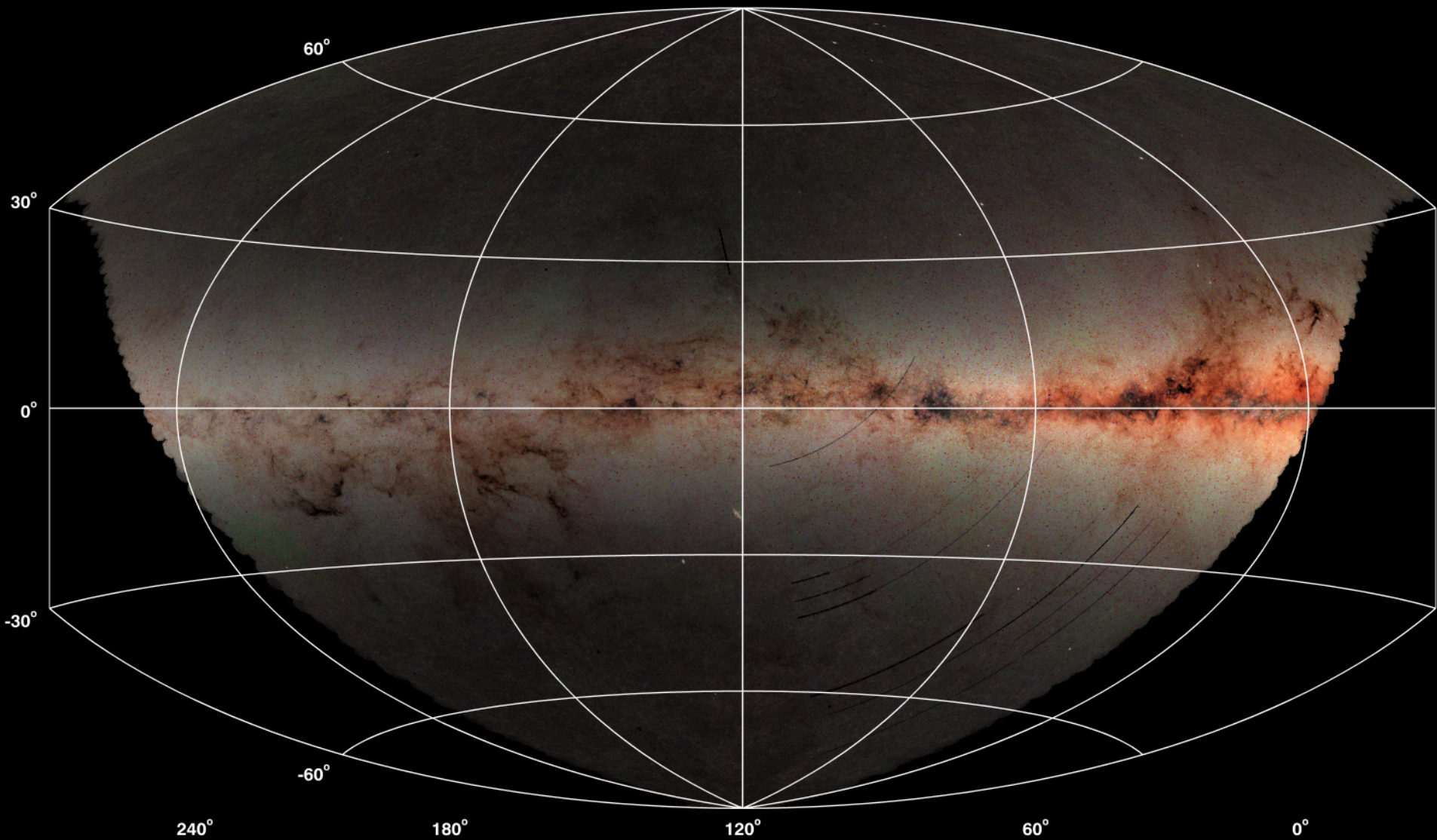
3PI Object counts, nDetections>2

1.8×10^9 objects



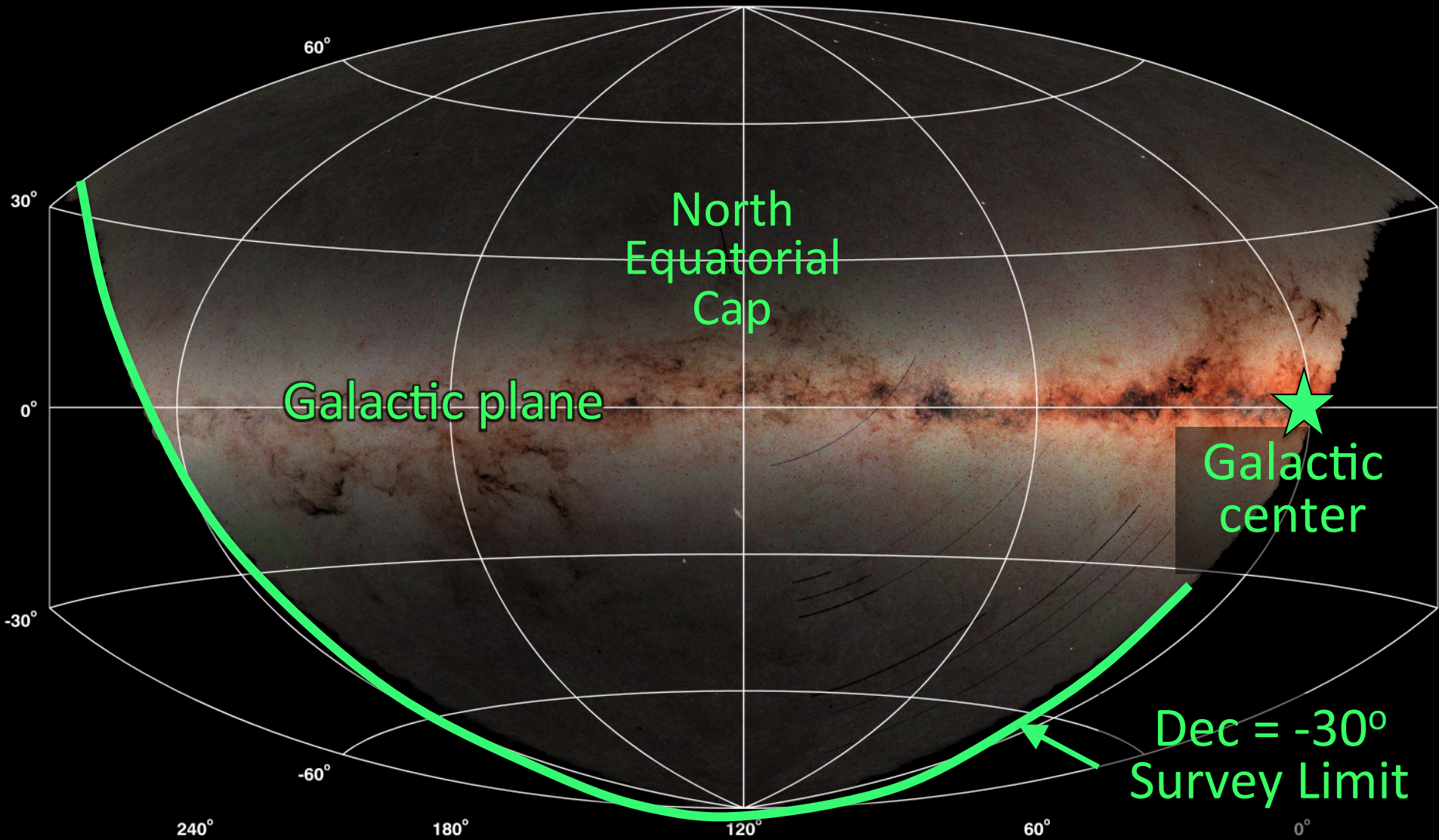
3PI *gry* mean colors

8.1×10^8 objects



3PI *gry* mean colors

8.1×10^8 objects



Current status

- 2 PB of disks with images were shipped from Hawaii to STScI in Sept 2015
 - After tests & OS patching, storage servers are online at STScI
- STScI is serving catalog databases to the PS1 Science Consortium
 - Includes PV1, PV2 versions of 3PI survey & PV3 version of 70 deg² selected area survey
 - Hawaii's DB machines have been shut down in preparation for final ingest of 3PI database



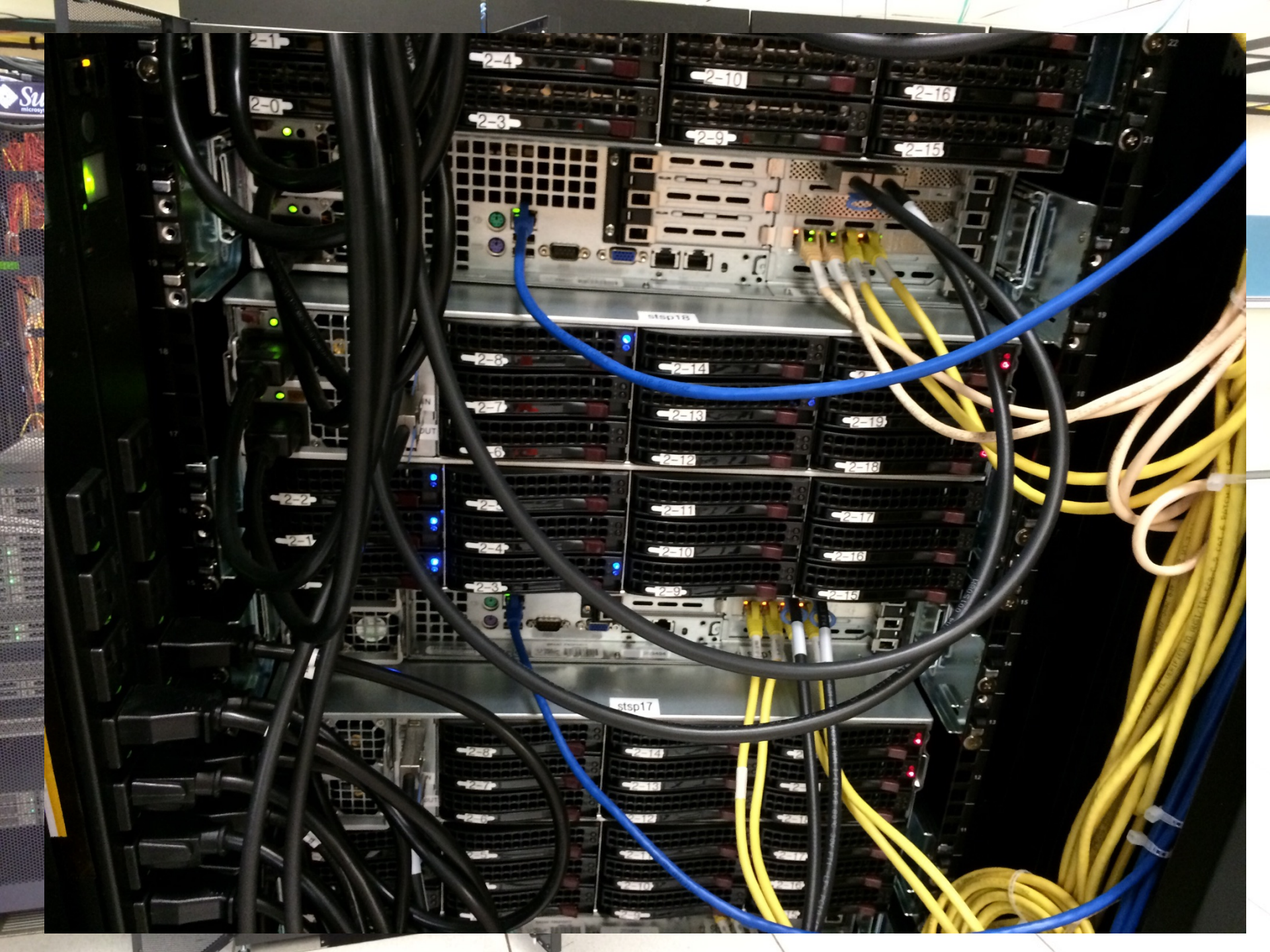
Leaving Maui, 2015 August 28

5000 pounds = 2.5 pounds/terabyte

Arriving at STScI, 2015 September 1



1/14/2016



Plans & schedule

- Final database population will start soon in Hawaii
 - Making a few last DB schema & catalog processing tweaks
 - 100 TB database will be copied to STScI via Internet
 - Tentative: March 2016
- Public archive will open as soon as practical after that
 - Plan to release catalogs and images simultaneously
 - We are currently advertising Spring 2016
- Medium Deep Survey final processing will follow

User Documentation

Confluence is being used to create documentation

Vast majority of docs will be written by STScI science staff

The screenshot shows a Confluence page titled "PanSTARRS" on the Space Telescope Science Institute website. The page includes a navigation bar with "Spaces", "People", and "Create" buttons, a search bar, and a user profile icon. The main content area features a "Pages" section with the title "PanSTARRS" and a sub-header "Added by Alex Yermolaev, last edited by Rick White on May 21, 2015 (view change)". The main text describes the Panoramic Survey Telescope and Rapid Response System (PanSTARRS) as a wide-field imaging facility on Haleakala, developed and operated by the Institute for Astronomy at the University of Hawaii. It mentions the initial science mission (2010 – 2014) known as PanSTARRS1 (or simply PS1) and its data products, including images and catalogs. A "Contents" section lists: Observatory, Surveys, Images, Catalogs, Data Retrieval, and Processing. On the right side, there is a photograph of the telescope and a table titled "PanSTARRS1" with the following data:

PanSTARRS1	
Location	Haleakala, Hawaii
Telescope	1.8 m diameter
Field of view	3 degree radius
Filters	g, r, i, z, y
Detectors	60 orthogonal transfer CCDs
Surveys	3pi, medium

PS1 image access interface

Simple cutout search page for 3PI images

[demo](#)

PanSTARRS1 3PI Image Access

ngc 4288 [Help](#)

Filters: color g r i z y

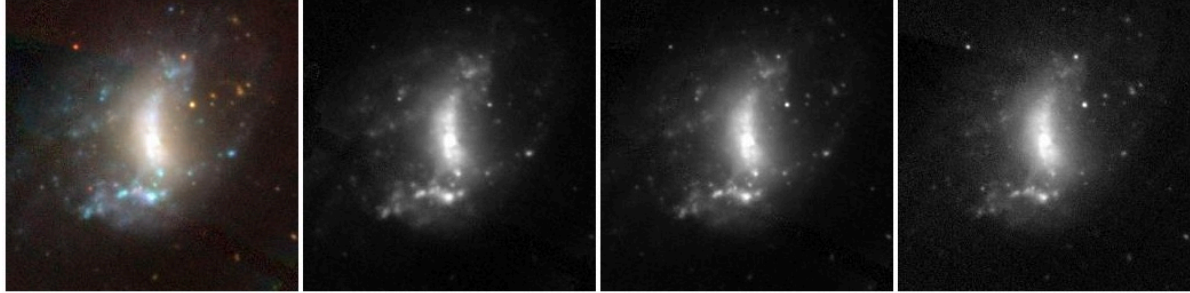
File types: stack warp

Cutout size: pixels (128.00 arcsec)

Output size: pixels

ngc 4288 (ra = 185.158790, dec = 46.291670)

stack 2258.055 i/r/g Display	stack 2258.055 g Display FITS FITS-cutout	stack 2258.055 r Display FITS FITS-cutout	stack 2258.055 i Display FITS FITS-cutout
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PanSTARRS1 3PI Image Access

ngc 4217 [Help](#)

Filters: color g r i z y

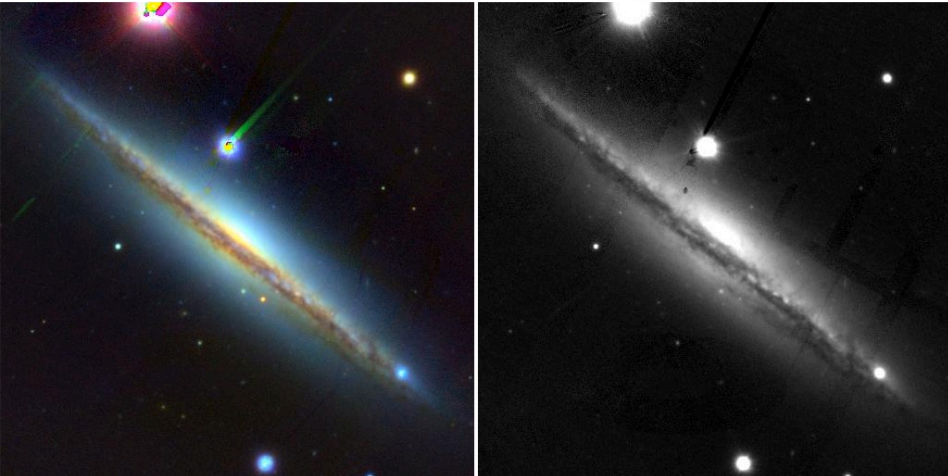
File types: stack warp

Cutout size: pixels (256.00 arcsec)

Output size: pixels

ngc 4217 (ra = 183.962080, dec = 47.091780)

stack 2258.077 y/i/g Display	stack 2258.077 g Display FITS FITS-cutout
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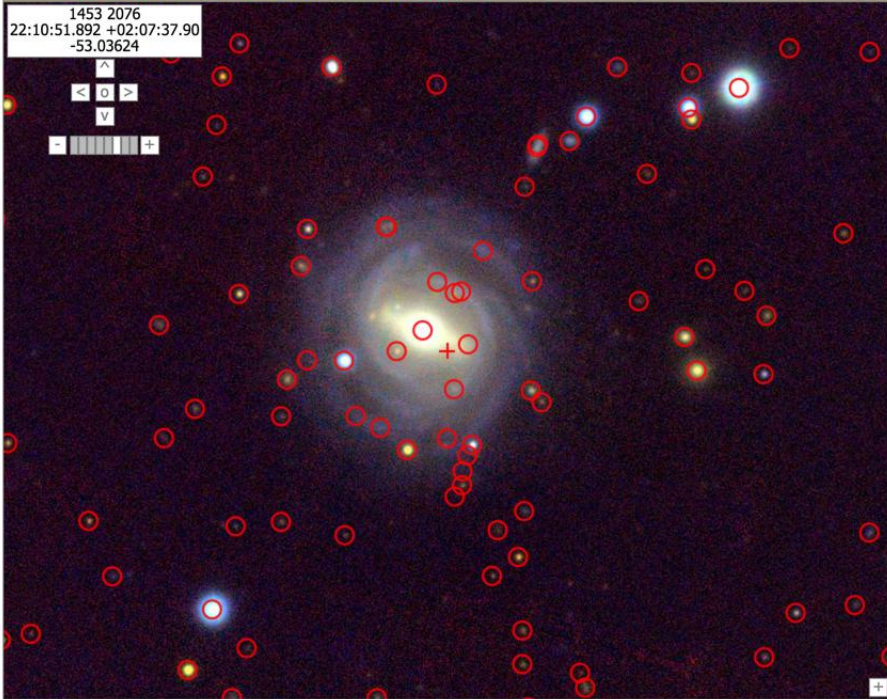


skycell.1405.053.stack

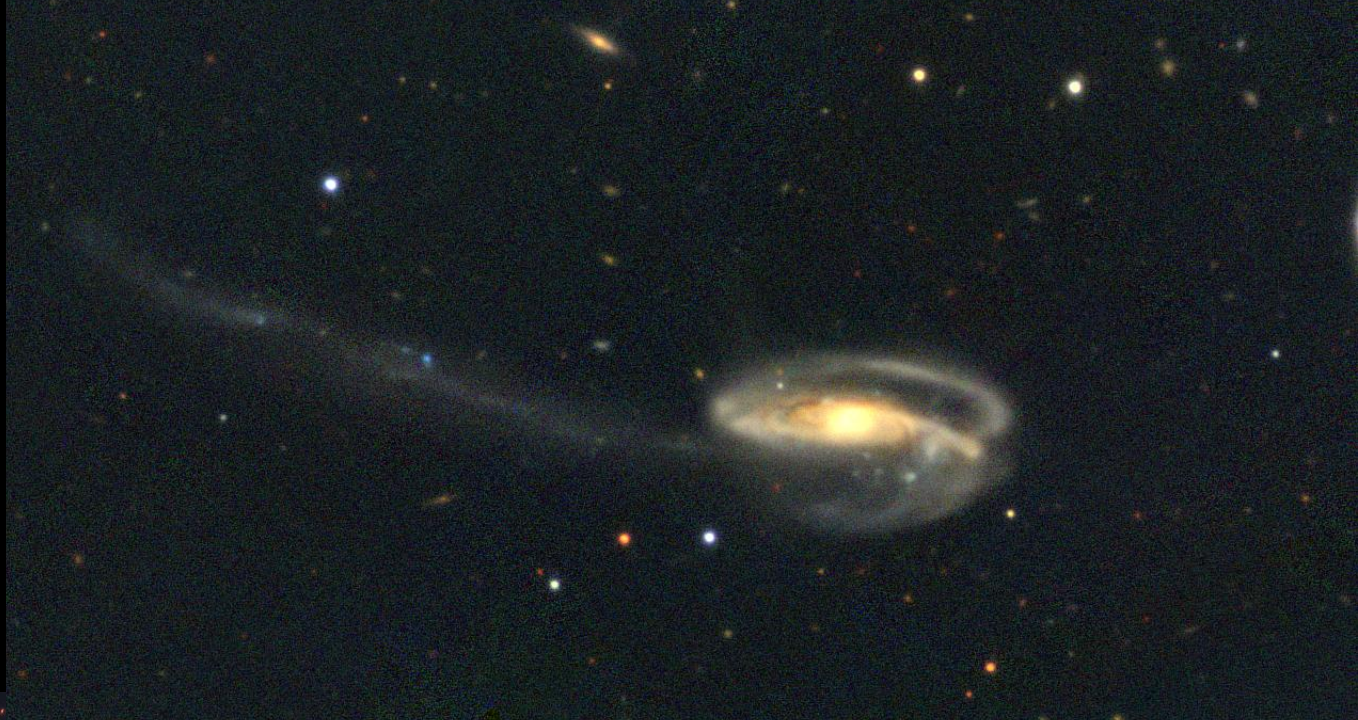
Lighter Darker Invert advanced contrast controls | PS1 controls | HSC controls

SDSS 2MASS FIRST GALEX HSC PS1 (5180)

1453 2076
22:10:51.892 +02:07:37.90
-53.03624



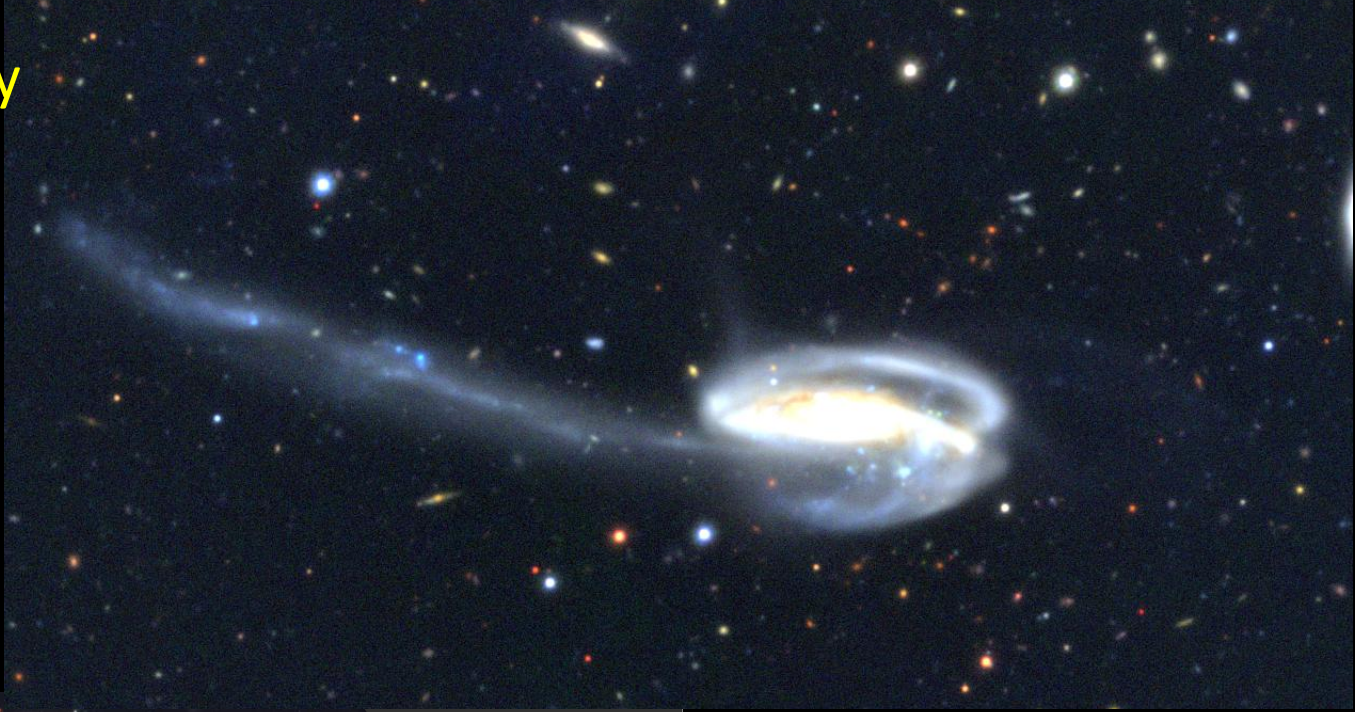
PS1 3PI
i/r/g



HST ACS i/r/g

Medium Deep Survey

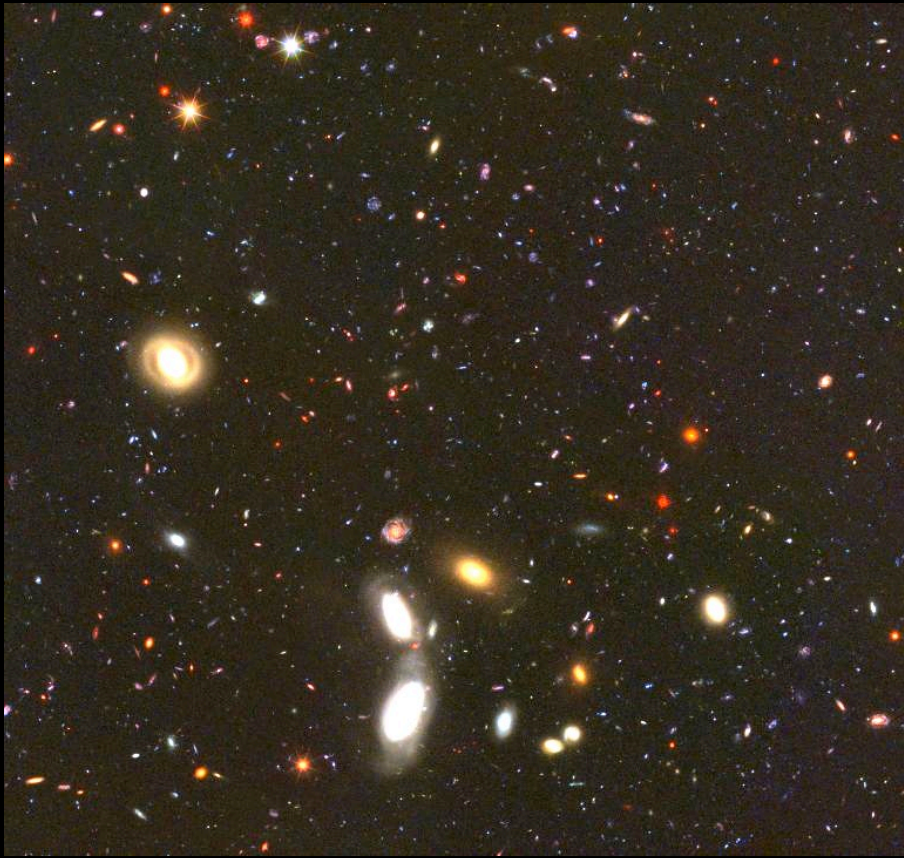
PS1 MD08
i/r/g



HST ACS i/r/g

Medium Deep Survey

~ 3 x 3 arcmin field



PS1 MD02 z/r/g



HST GOOD-S
z/r/g