



# HSC-SSP data processing status and support for open-use observers

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SSP Data Processing Status

# Processing Software

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hscPipe, a version of LSST stack, has been primarily developed by the software group at Princeton, Yasuda-san at IPMU, and NAOJ.

The code is getting shape:

- Internal : 1% PSF photometry,  $\sim 3$ mas astrometry
- Against PS1: 1-2% PSF photometry,  $\sim 40$ mas astrometry



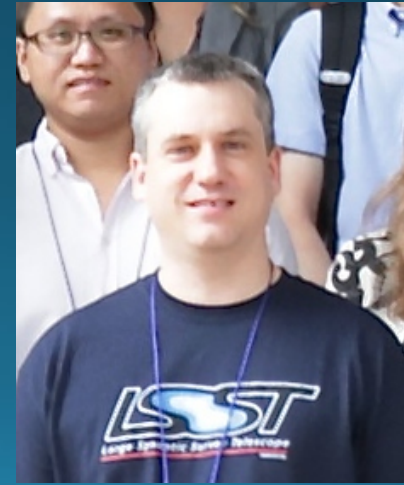
Robert Lupton



Bob Armstrong



Jim Bosch



Paul Price



Naoki Yasuda

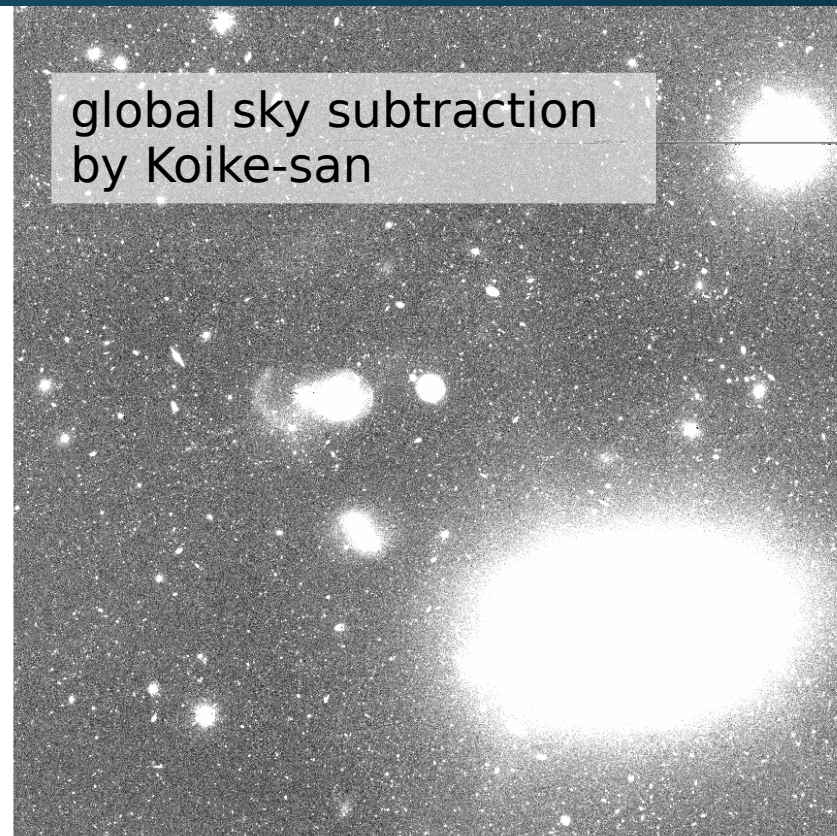
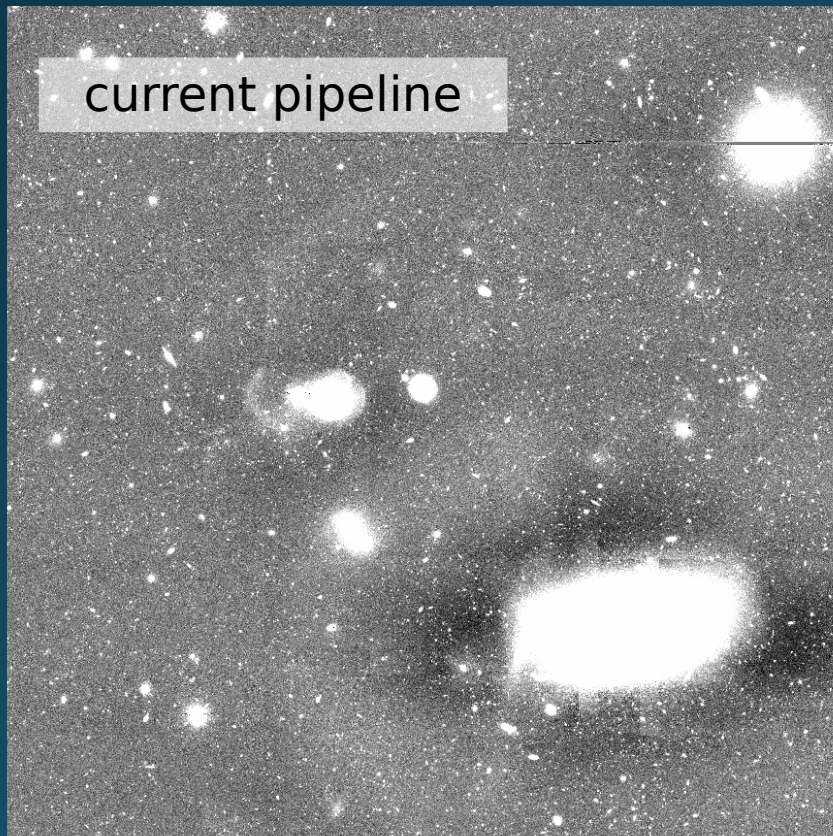


## Processing Software – contd.

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But, there are still some problems:

- PSF modeling failure under too-good-seeing
- Over-subtracted sky around large objects
- Deblender failure in very crowded areas
- etc.



# Code Merge

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hscPipe has been fully ported back to the main LSST codebase.

This ‘code merge’ introduces changes in the commands as well as in the table schema (and there are a lot more changes deeper in the codes).

```
reduceFrames.py → singleFrameDriver.py  
stack.py → coaddDriver.py  
multiBand.py → multiBandDriver.py
```

The next SSP data processing will be done with the LSST stack.

We will update the pipeline manual for open-use observers.

# HSC-SSP Internal Data Releases

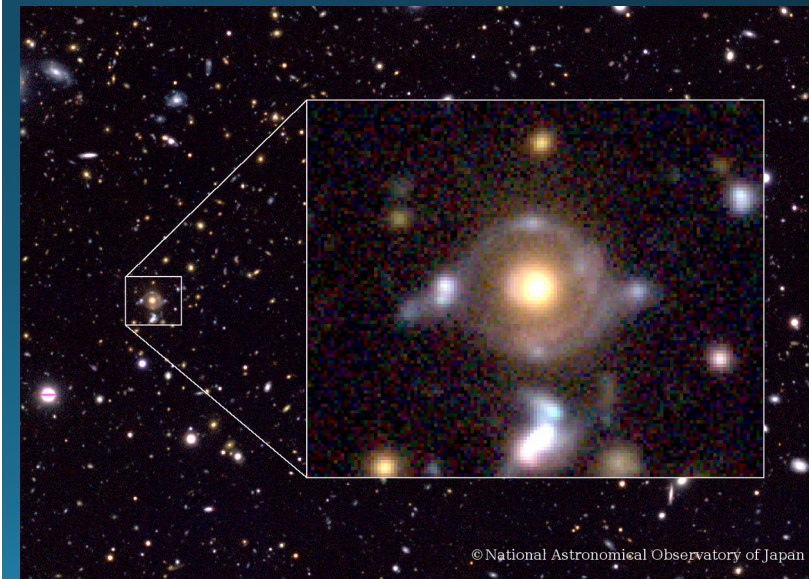
**S15B release** on Jan 29 including 100sqdeg of full-color full-depth area

**S16A release** on Aug 4 including 170sqdeg of full-color full-depth area

See poster P10 for details.

There are already papers based on these releases – Toba et al., More et al., Homma et al. (see talk on day 3), Tanaka et al. (see talk by Ken), just to name a few and more papers are in prep. We are working hard towards a PASJ special issue on the first year HSC papers.

| Release | Date       | Layer | N<br>filter | Area* <sup>1</sup><br>(deg <sup>2</sup> ) | Files<br>(TBytes) | N<br>object | Version<br>hscPipe |
|---------|------------|-------|-------------|-------------------------------------------|-------------------|-------------|--------------------|
| S14A0   | 2014-09-04 | udeep | 5           | 2                                         | 2.2               | 880,792     | 2.12.4a            |
|         |            | wide  | 2           | 25                                        | 2.6               | 10,548,142  | 2.12.4a            |
| S14A0b  | 2015-02-10 | udeep | 5           | 4                                         | 6.4               | 2,183,707   | 2.12.4d            |
|         |            | wide  | 5           | 85                                        | 18.6              | 63,954,672  | 3.4.1              |
| S15A    | 2015-09-01 | udeep | 6           | 4                                         | 7.2               | 3,795,834   | 3.8.5              |
|         |            | deep  | 6           | 38                                        | 17.7              | 24,403,754  | 3.8.5              |
|         |            | wide  | 5           | 180( 80)                                  | 40.7              | 104,196,326 | 3.8.5              |
| S15B    | 2016-01-29 | udeep | 7           | 4                                         | 8.6               | 5,073,357   | 4.0.1              |
|         |            | deep  | 7           | 38                                        | 16.6              | 25,918,070  | 4.0.1              |
|         |            | wide  | 5           | 400(100)                                  | 145.2             | 259,305,970 | 4.0.1              |
| S16A    | 2016-08-04 | udeep | 7           | 4                                         | 7.5               | 5,089,002   | 4.0.2              |
|         |            | deep  | 7           | 38                                        | 8.0               | 26,405,915  | 4.0.2              |
|         |            | wide  | 5           | 440(170)                                  | 245.0             | 294,392,329 | 4.0.2              |



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Tanaka et al. 2016 ApJ

# Data Retrieval Tools

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Our current data retrieval tools are similar to SDSS: CAS and DAS.

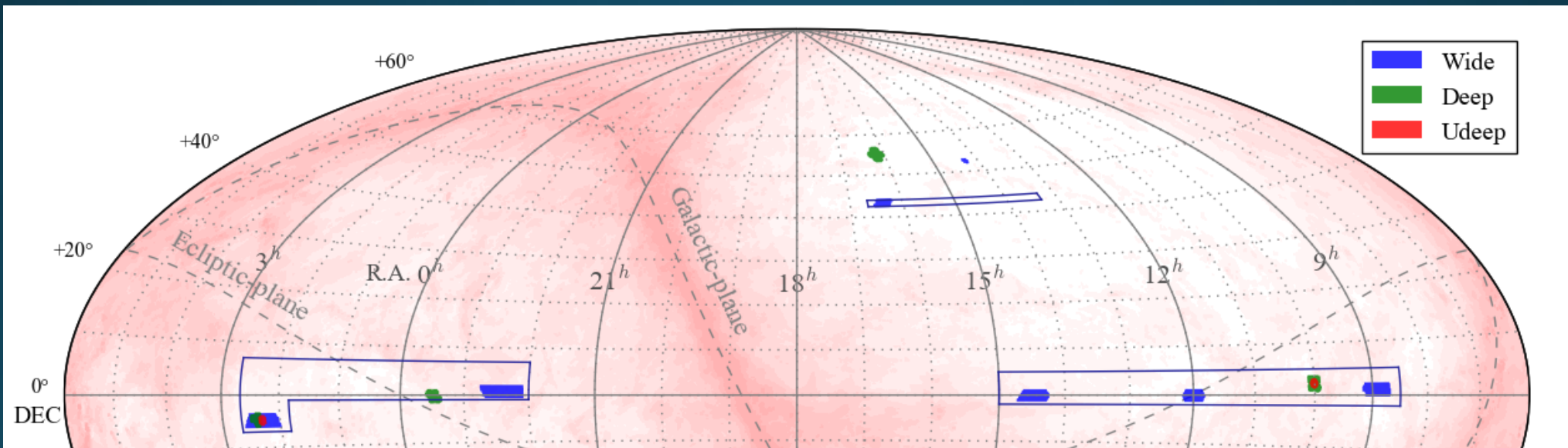
We are going to make a step forward with unified CAS and DAS capabilities and 'controllable' hscMap. This is led by Hayashi-san, Mineo-sensei, and Koike-san. Some of these tools will be made available in the next internal data release. Stay tuned!

# First Public Data Release

We are going to make the first public data release of HSC in late Feb. The release will include

- all of D + UD data
- full-color full-depth Wide data (108 sqdeg)
- value-added products such as photo-z, public spec-z collection, etc.

from S15B. We have been working very hard to make it happen and we will soon be able to release the public site to the HSC collaboration. The data release paper is being prepared as well.



## HSC-SSP + UH Collaboration

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HSC-SSP and UH agreed to collaborate on the COSMOS field and make coadds using data from both teams and release to the public. The combined data set will reach:

| filter | Exposure time | Expected depth<br>(5sigma, point source) |
|--------|---------------|------------------------------------------|
| g      | 3.2h          | 27.8                                     |
| r      | 1.4h          | 27.1                                     |
| i      | 7.3h          | 27.0                                     |
| z      | 6.0h          | 26.3                                     |
| y      | 11.1h         | 25.7                                     |

The data are being processed and our current plan is to release the processed data to the HSC collaboration and UH later this month. We then make it available to the public around ~April.

Yukie Oishi



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Support for Open-Use Observers

# Helpdesk

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Any problems with processing your HSC data? Contact the helpdesk at

`helpdesk@anelab.mtk.nao.ac.jp`

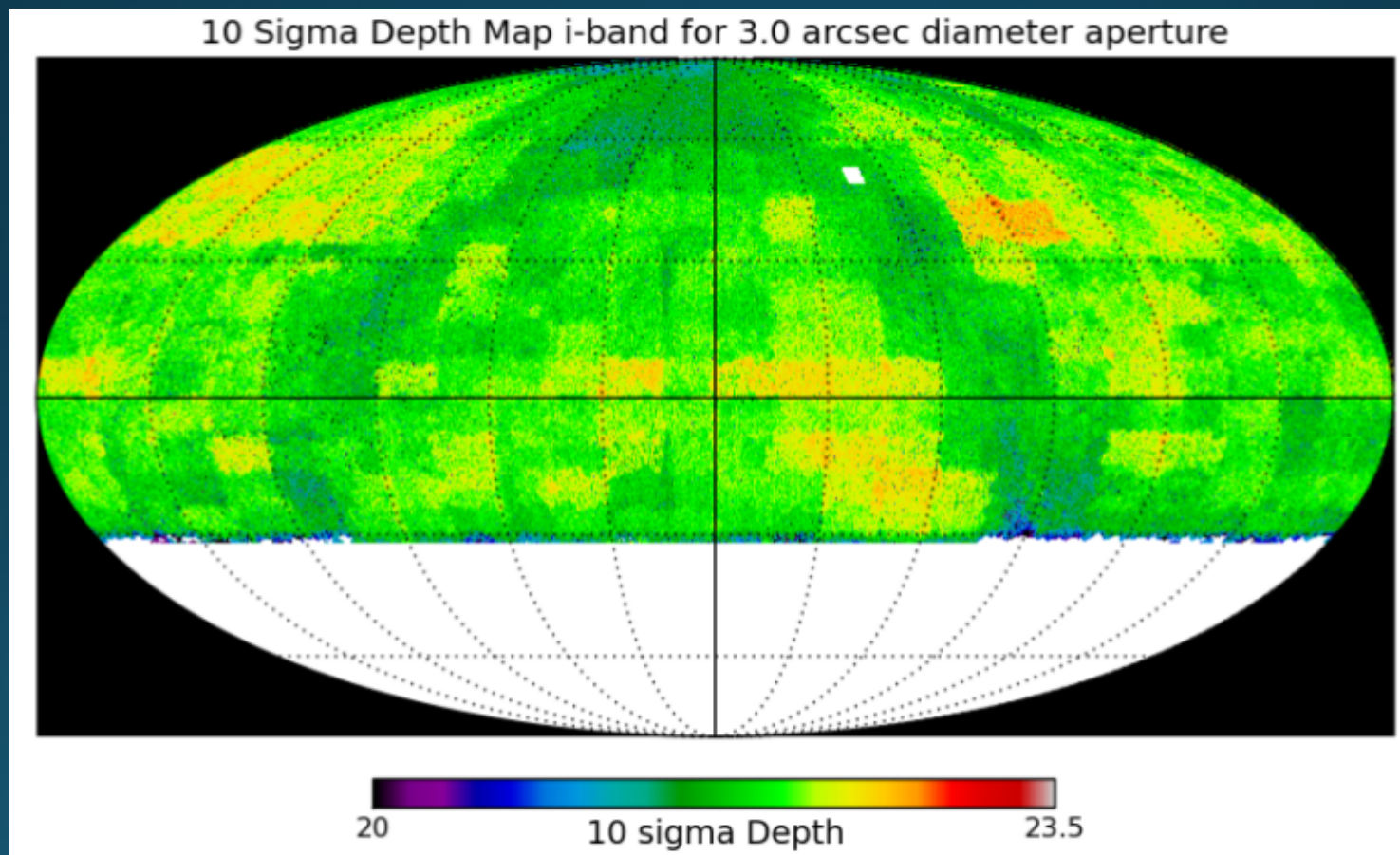
and Oishi-san will help you! Also, refer to the pipeline manual page for pipeline binary packages, data reduction machine (Hanaco) and details of the pipeline processing:

`http://hsc.mtk.nao.ac.jp/pipedoc\_e/`

For details, please see poster P03!

## Updates for Open-Use Observers

- Code merge – we will update the pipeline manual.
- PanSTARRS1 calibration catalog will soon be available, at last! Thanks to Paul Price.



# Processed Data Delivery

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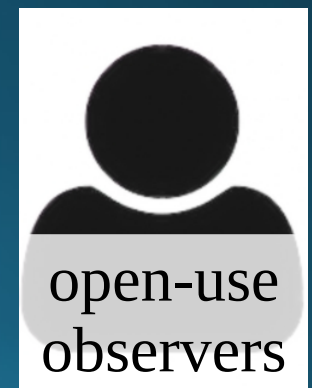
- One of our mid-term projects is to process data at NAOJ and deliver processed images and catalogs to open-use observers after each observing run.
- Oishi-san has been working on the automated processing scripts and we plan to start tests using real data. We might randomly pick a few programs from an HSC run, process data, and possibly deliver data to users.
- Our *hope* is to start this ‘delivery service’ on a few years timescale.



Data Acquisition

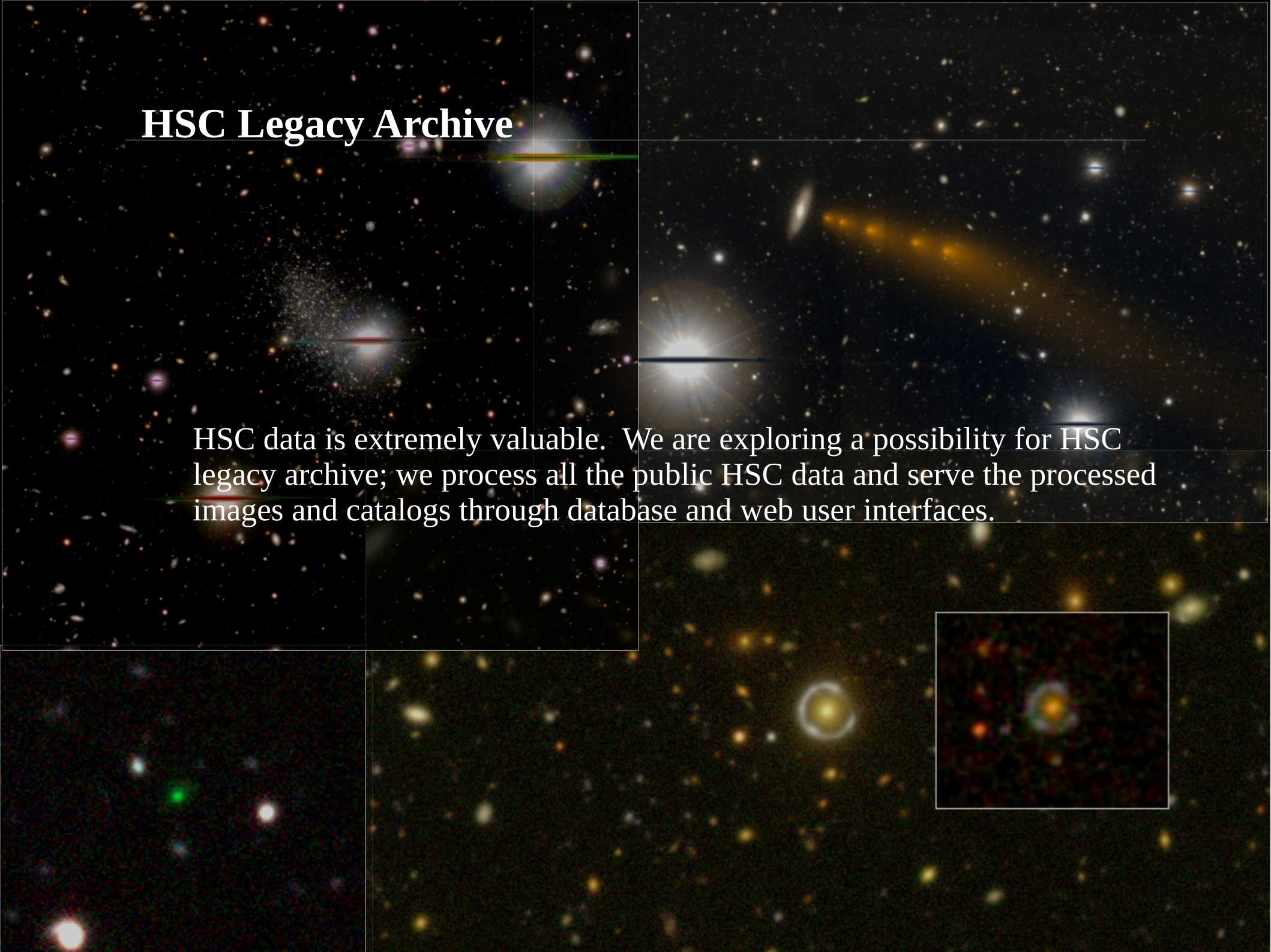


Data Processing



You receive processed data

# HSC Legacy Archive



HSC data is extremely valuable. We are exploring a possibility for HSC legacy archive; we process all the public HSC data and serve the processed images and catalogs through database and web user interfaces.





Have fun with the HSC data!

