The New ADS Search Interface and API

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for the ADS team - @adsabs

28 September 2013
IVOA Kona

The ADS "Classic" System

- No frameworks available in mid 1990s that matched our needs:
  - RDBMS too slow, limited in capabilities
  - no open source SQL engine
  - big overhead in administration
- ADS Database and search engine circa 2009:
  - custom-built software ~15 years old
  - search engine over 250K lines of C code
  - applications over 250K lines of C, PERL, python
- A "Big ball of mud" system:
  - organic growth over a long period of time
  - developed by different individuals
  - lots of IP locked into the code, no documentation

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- Launched in late 2010, mostly based on the ADS Classic search engine
- Includes facets (computed over top N papers) as well as a separate full-text search options
- Introduces interactive visualizations, recommendations, and later metrics
- Built using python, webpy, CSS, jQuery
- Useful platform for testing features, conduct usability studies, gather user feedback

New ADS Architecture

- Metadata curation and management: **Invenio**
  - Developed by CERN, used by HEP's bibliographic system (INSPIRE)
  - 200K python LOC
  - Bibliographic data ingest, merging, citation linking
- Indexing and searching: **SOLR/Lucene**
  - Enterprise search platform developed by Apache Foundation, used by thousands of websites
  - 350K java LOC
  - Indexing, searching, filtering, relevancy ranking
- Aggregation, Logging, User Database: **MongoDB**
  - Scalable, high-performance, open source NoSQL database
  - Supports replication, high-availability, sharding, aggregation,
  - A document store based on JSON and with a javascript engine

ADS 2.0

- A platform built on web and digital library standards
- A new, extensible, industrial strength search engine
- A public API with various access control capabilities
- A set of applications supporting search, export, visualization, analysis
- A collaborative, open source development model
- A community of scientists and curators using and contributing to the system on a daily basis

Technology Transitions

	Classic	Labs	2.0
Metadata	Custom	MARC	Bibframe?
Serialization	HTML	XML	JSON
Search Paradigm	Direct search	Faceted (limited)	Scalable facets
Templating	C + HTML	CSS, webpy	Flask, jquery, bootstrap, d3
Storage	filesystem	SQL	MongoDB
Editing	vi + scripts	vi + scripts	openRefine
Content	metadata	metadata	full-text

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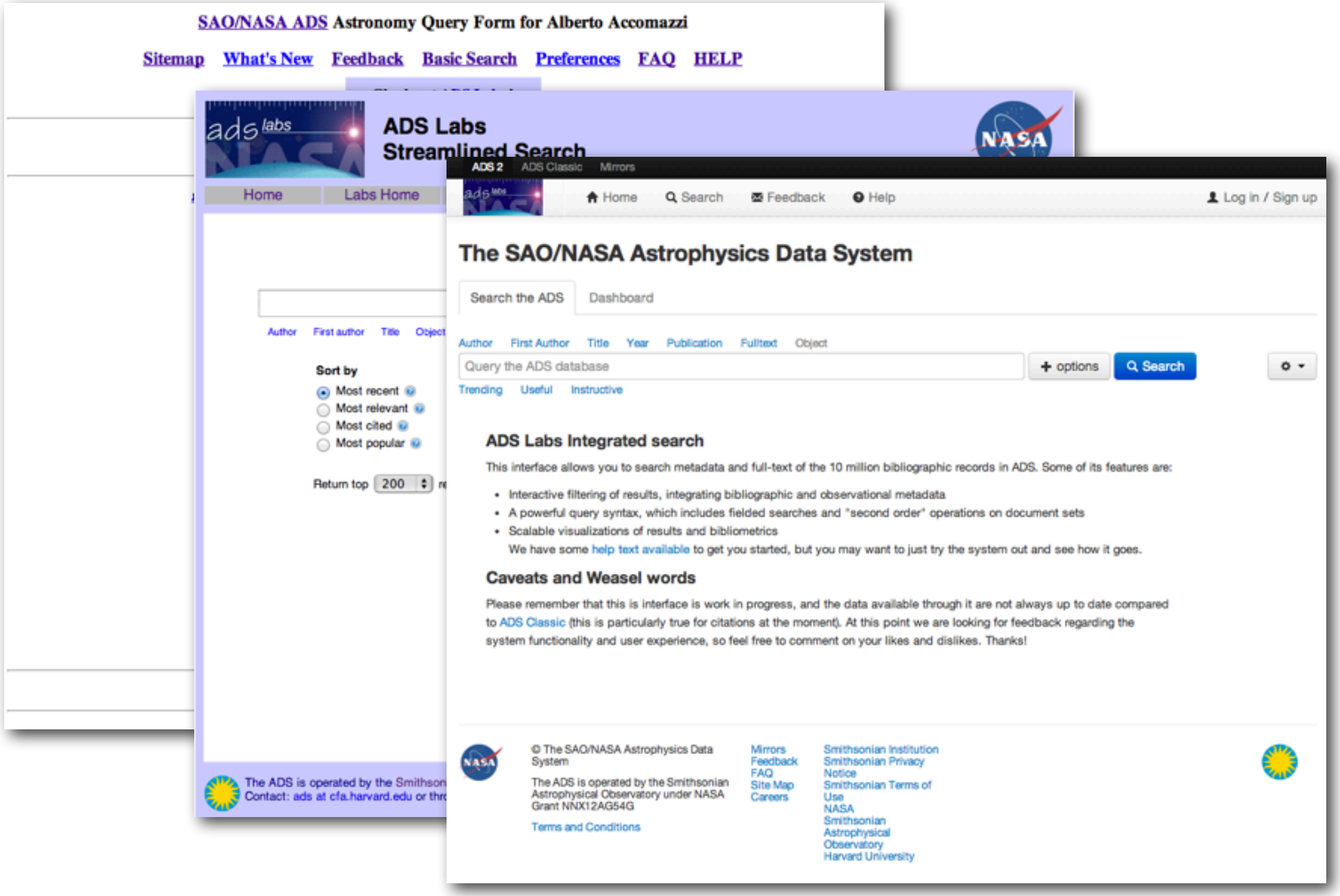
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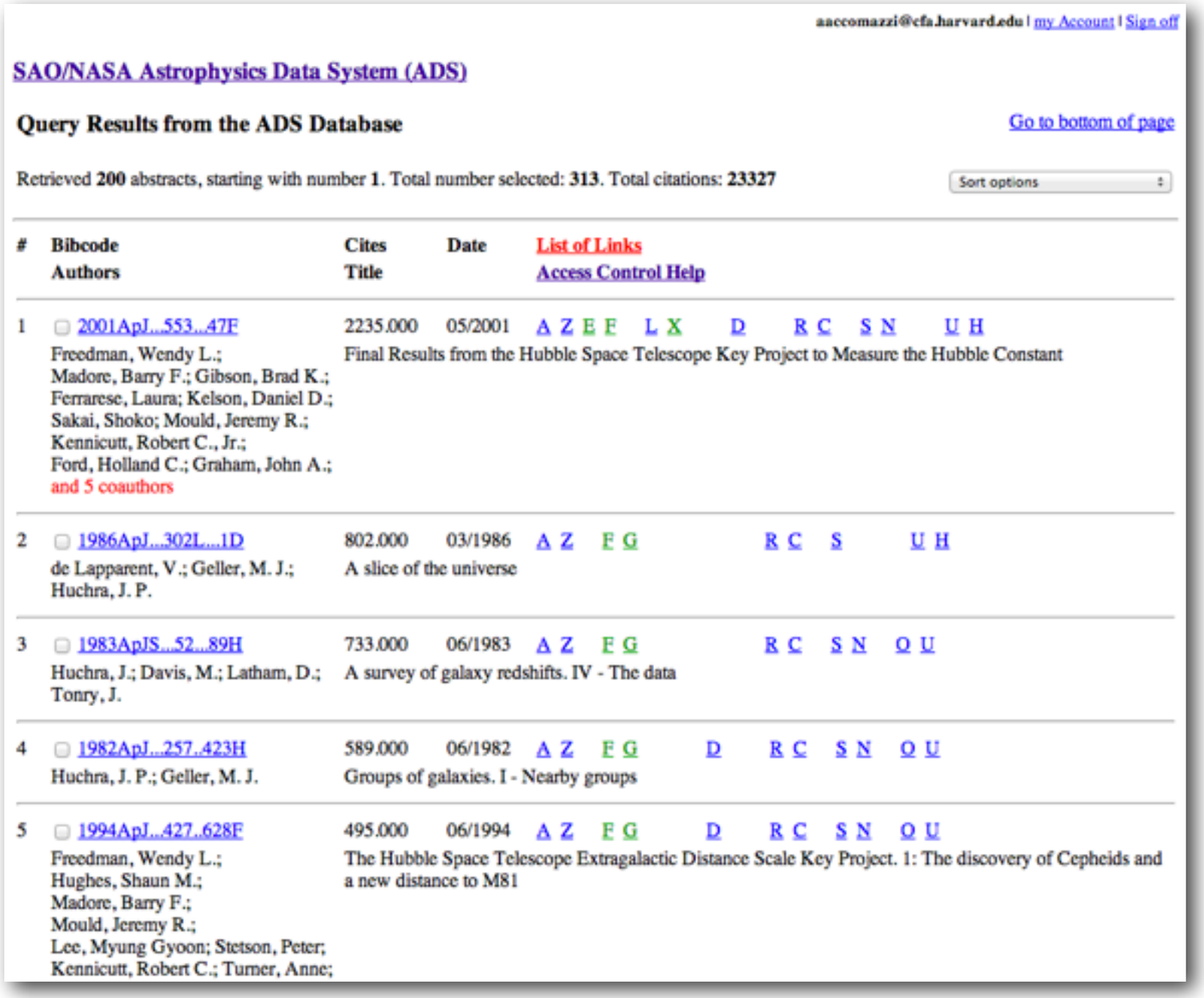

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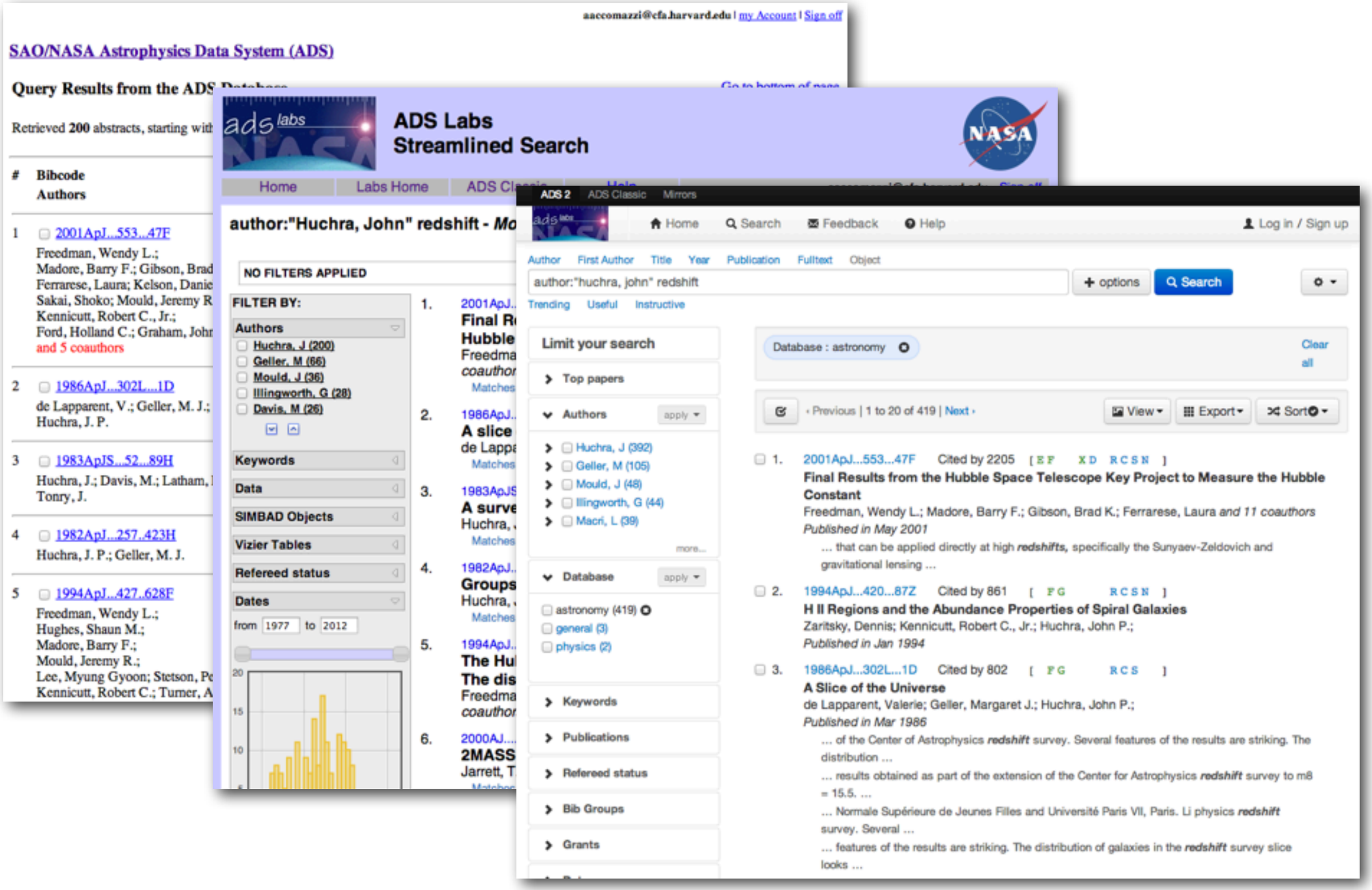
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We present here the final results of the Hubble Space Telescope (HST) Key Project to measure the Hubble constant. We summarize our method, the results, and the uncertainties, tabulate our revised distances, and give the implications of these results for cosmology. Our results are based on a Cepheid calibration of several secondary distance methods applied over the range of about 60-400 Mpc. The analysis presented here benefits from a number of recent improvements and refinements, including (1) a larger LMC Cepheid sample to define the fiducial period-luminosity (PL) relations, (2) a more recent HST Wide Field and Planetary Camera 2 (WFPC2) photometric calibration, (3) a correction for Cepheid metallicity, and (4) a correction for incompleteness bias in the observed Cepheid PL samples. We adopt a distance modulus to the LMC (relative to which the more distant galaxies are measured) of μ0(LMC)=18.50+/-0.10 mag, or 50 kpc. New, revised distances are given for the 18 spiral galaxies for which Cepheids have been discovered as part of the Key Project, as well as for 13 additional galaxies with published Cepheid data. The new calibration results in a Cepheid distance to NGC 4258 in better agreement with the maser distance to this galaxy. Based on these revised Cepheid distances, we find values (in km s-1 Mpc-1) of H0=71+/-2 (random)+/-6 (systematic) (Type Ia supernovae), H0=71+/-3+/-7 (Tully-Fisher relation), H0=70+/-5+/-6 (surface brightness fluctuations), H0=72+/-9+/-7 (Type II
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Authors: Freedman, Wendy L.; Madore, Barry F.; Gibson, Brad K.; Ferrarese, Laura; Kelson, Daniel D.; Sakai, Shoko; Mould, Jeremy R.; Kennicutt, Robert C., Jr.; Ford, Holland C.; Graham, John A.; Huchra, John P.; Hughes, Shaun M. G.; Illingworth, Garth D.; Macri, Lucas M.; Stetson, Peter B.
Journal: The Astrophysical Journal, Volume 553, Issue 1, pp. 47-72.
Publication Date: 05/2001
Origin: UCP
Astronomy Keywords: Stars: Variables: Cepheids, Cosmology: Observations, Cosmology: Distance Scale, Galaxies: Distances and Redshifts
DOI: 10.1086/320638
Bibliographic Code: 2001ApJ...553...47F

Abstract

We present here the final results of the Hubble Space Telescope (HST) Key Project to measure the Hubble constant. We summarize our method, the results, and the uncertainties, tabulate our revised distances, and give the implications of these results for cosmology. Our results are based on a Cepheid calibration of several secondary distance methods applied over the range of about 60-400 Mpc. The analysis presented here benefits from a number of recent improvements and refinements, including (1) a larger LMC Cepheid sample to define the fiducial period-luminosity (PL) relations, (2) a more recent HST Wide Field and Planetary Camera 2 (WFPC2) photometric calibration, (3) a correction for Cepheid metallicity, and (4) a correction for incompleteness bias in the observed Cepheid PL samples. We adopt a distance modulus to the LMC (relative to which the more distant galaxies are measured) of μ₀(LMC)=18.50+/-0.10 mag, or 50 kpc. New, revised distances are given for the 18 spiral galaxies for which Cepheids have been discovered as part of the Key Project, as well as for 13 additional galaxies with published Cepheid data. The new calibration results in a Cepheid distance to NGC 4258 in better agreement with the maser distance to this galaxy. Based on these revised Cepheid distances, we find values (in km s⁻¹ Mpc⁻¹) of H₀=71+/-2 (random)+/-6 (systematic) (Type Ia supernovae), H₀=71+/-3+/-7 (Tully-Fisher relation), H₀=70+/-5+/-6 (surface brightness fluctuations), H₀=72+/-9+/-7 (Type II supernovae), and H₀=82+/-6+/-9 (fundamental plane). We combine these results for the different methods with three different weighting schemes, and find good agreement and consistency with H₀=72+/-8 km s⁻¹ Mpc⁻¹. Finally, we compare these results with other, global methods for measuring H₀. Based on observations with the NASA/ESA Hubble Space Telescope, obtained at the Space Telescope Science Institute, which is operated by AURA, Inc., under NASA contract NAS5-26555.

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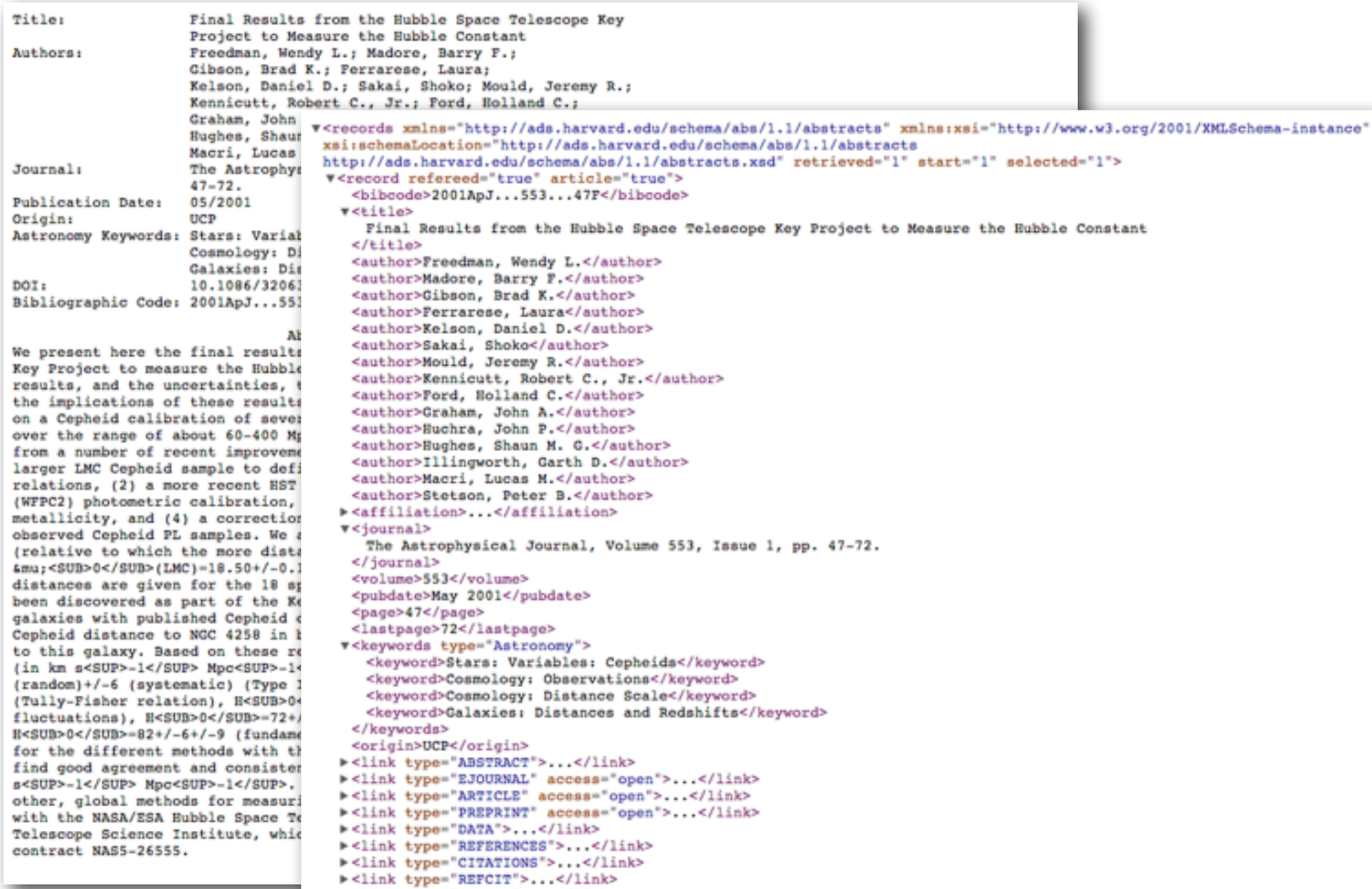

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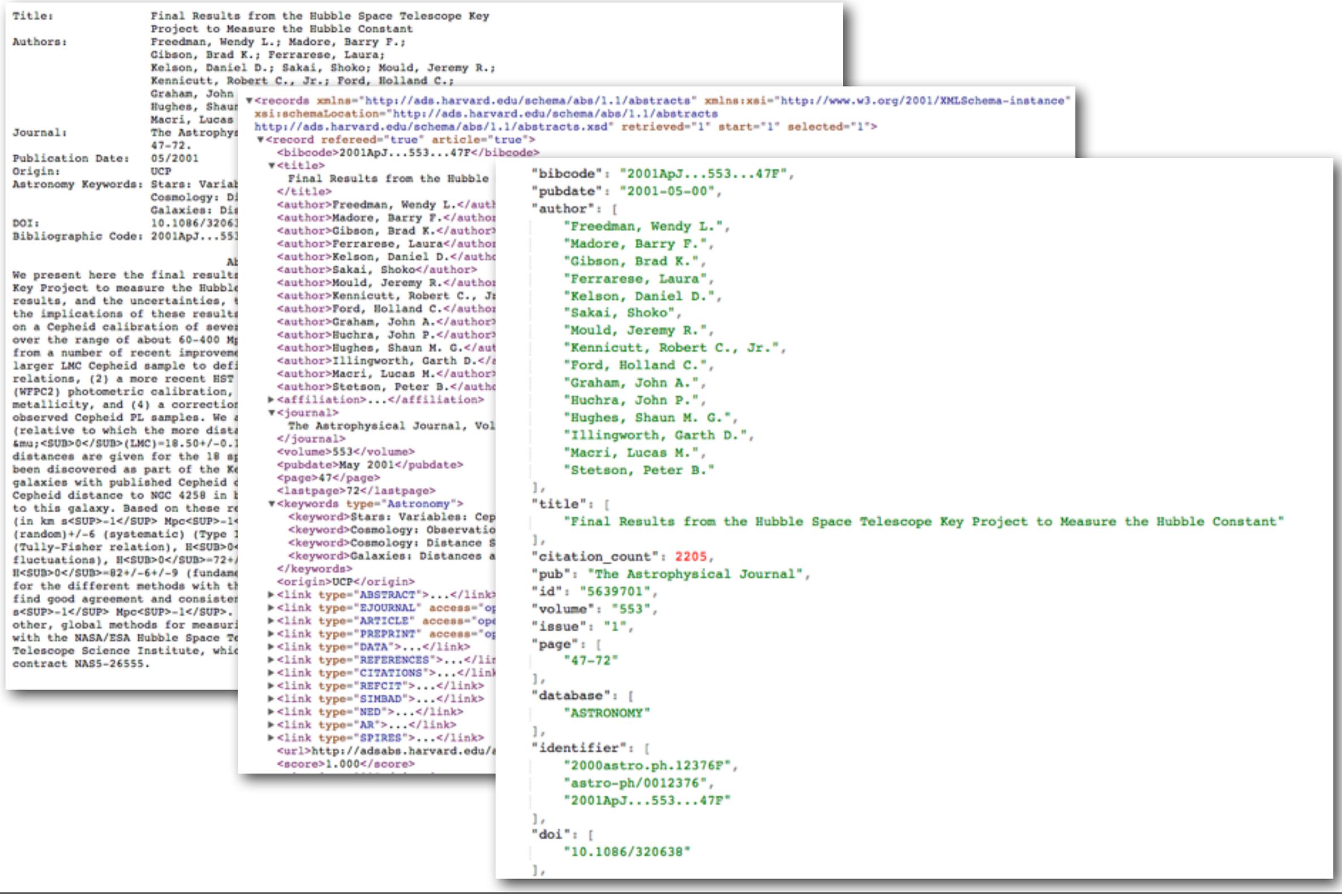
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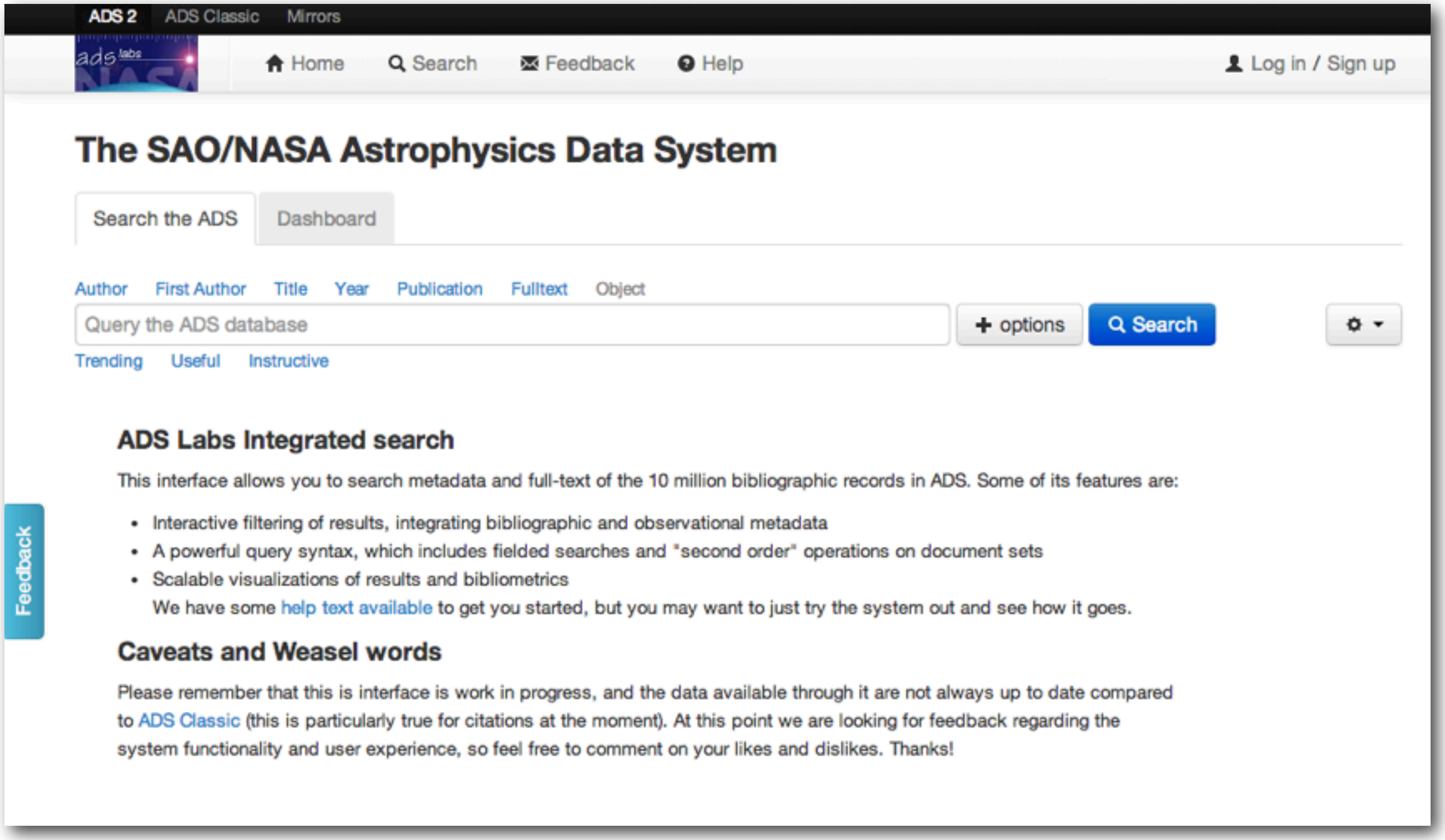


Don’t forget the API

http://github.org/adsabs

README.md

adsabs-dev-api

Developer API service description and example client code.

For answers to some frequently asked questions check out the wiki.

For bugs, feature requests or even random questions feel free to use the issues section.

Table of Contents

Settings

HTTPS clone URL

https://github.com/

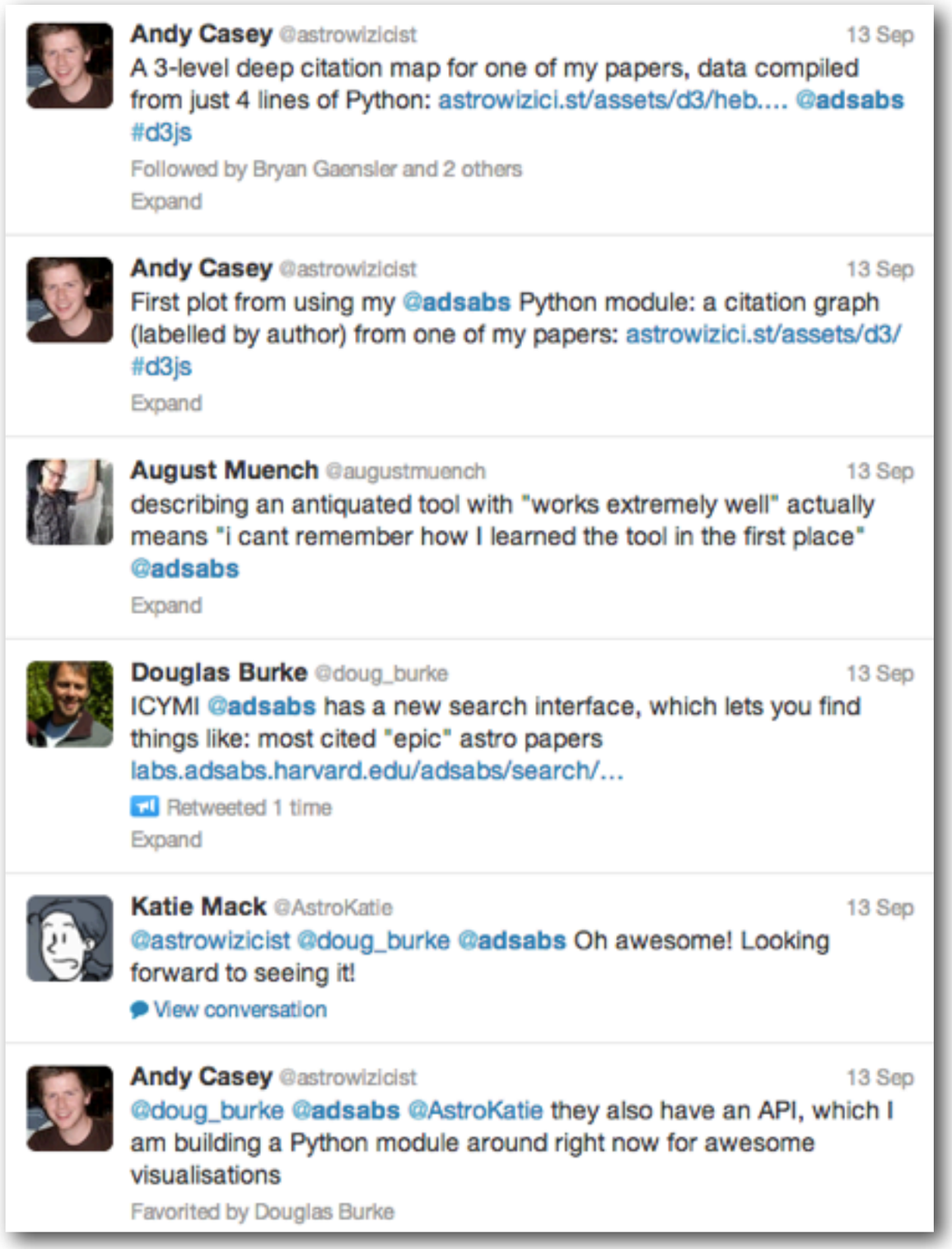
You can clone with HTTPS, SSH, or Subversion.

Clone in Desktop

Download ZIP

Our Hope

- Too many things to do, too little time, but...
- Let clever people come up with new ways to use ADS data
- At same time, we want to let the expert contribute content and context to ADS
- Examples: end-users, DST4L class and projects, ADSASS, bibliographies



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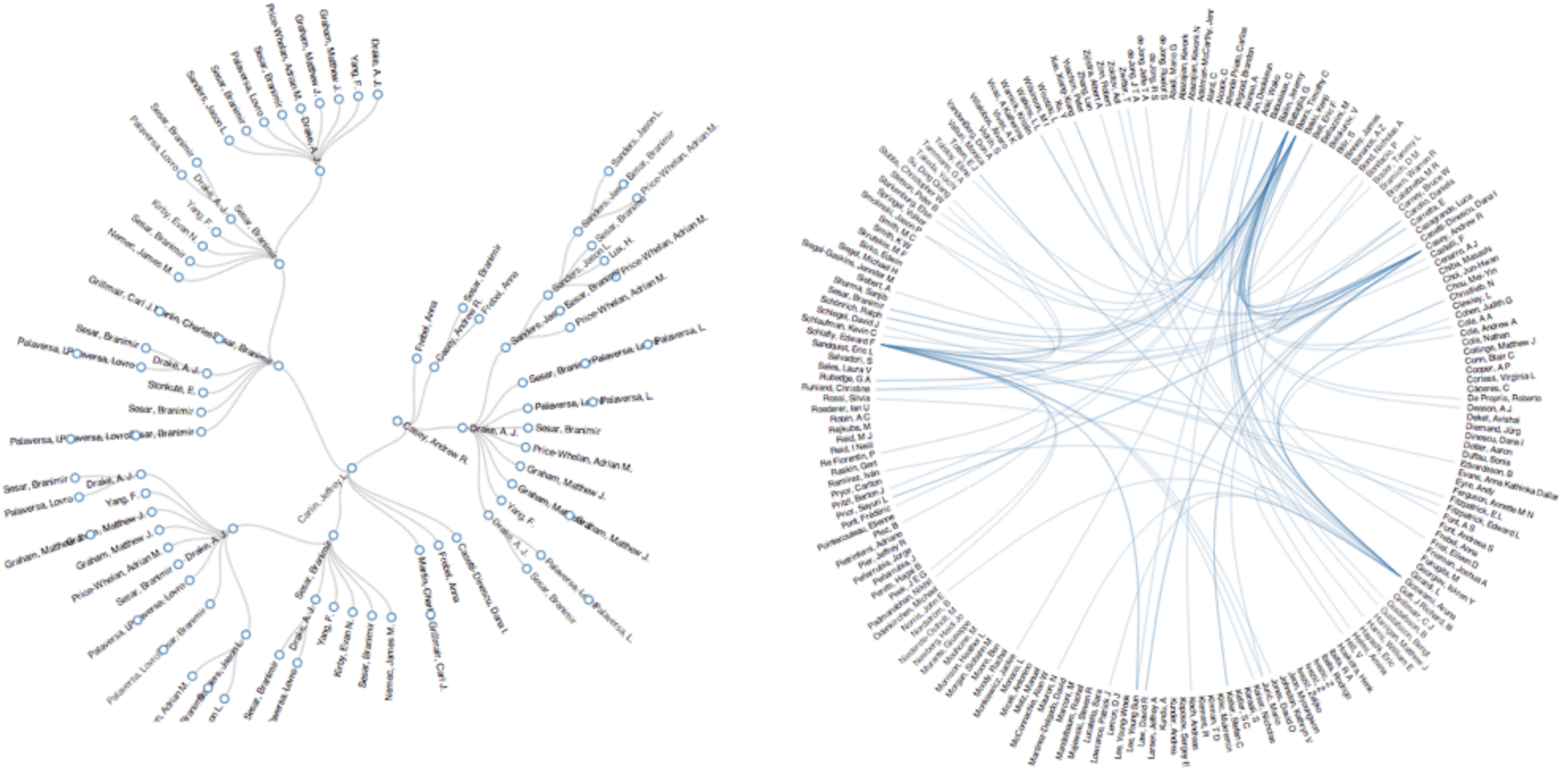

Credit: Andy Casey

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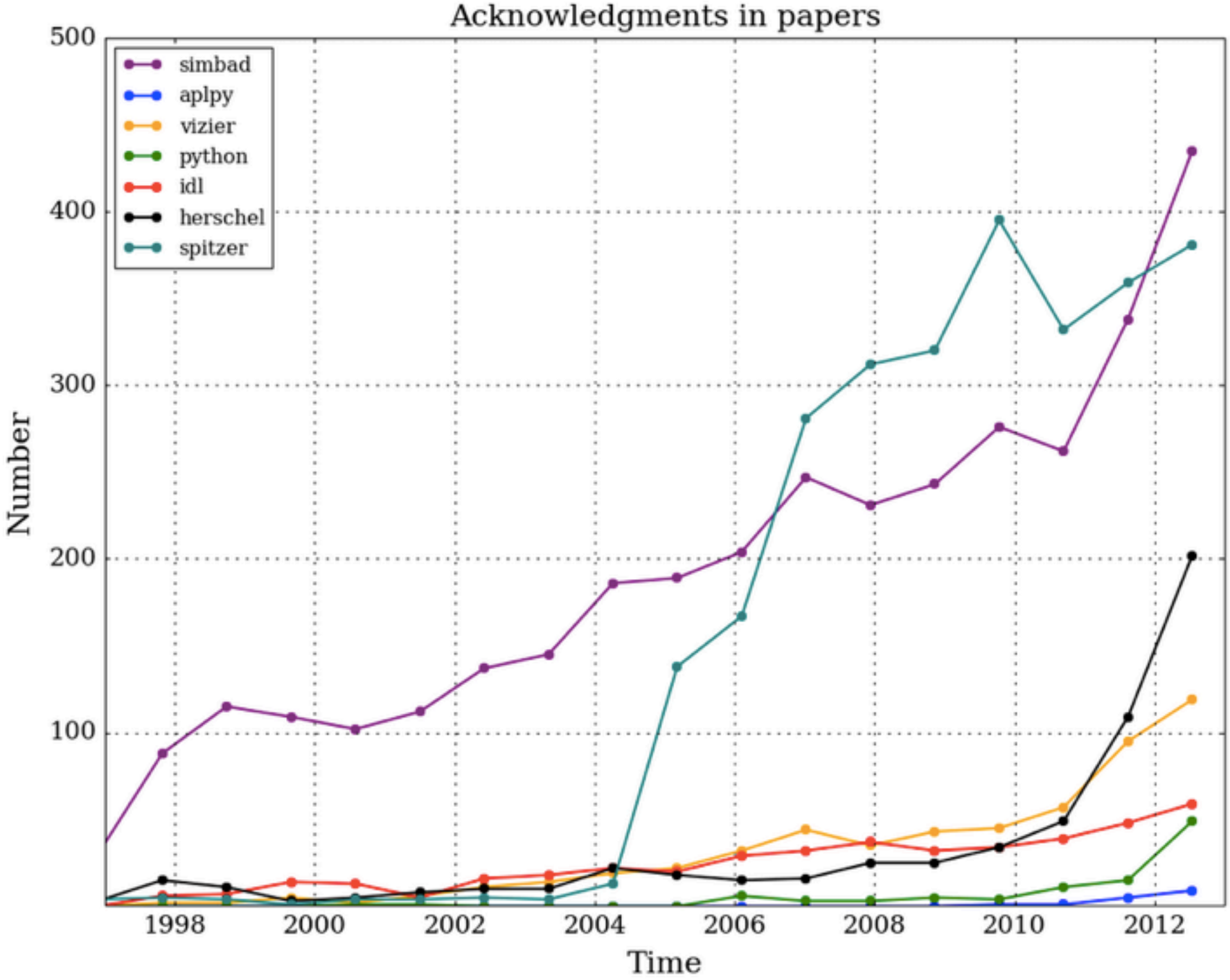

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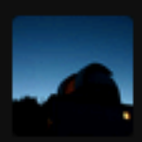

Thomas Robitaille @astrofrog 3d

A late #dotastro hack: using the ADS API to find acknowledgments in papers vs time - any requests? pic.twitter.com/vjImQDrgcH

Next: improving distributed curation

- Provide the technology and platform to facilitate the efforts already taking place, leveraging annotations
- Create a web-based portal supporting user profiles and curatorial roles (scientist, librarian, collaborator)
- Implement discovery tools supporting curator-supplied terms to allow targeted search, fine-grained annotations, review and validation of results
- Develop richer APIs to support private and public sharing of annotations, integration in third party platforms (publishers websites, authoring platforms such as Authorea, etc.)
- We are now developing workflows to support the curation of NASA award bibliography; this may serve as a test case for future work

For More Information

- ADS Labs (and 2.0): http://adslabs.org
- News, updates, presentations: @adsabs
  https://www.facebook.com/nasaads
  http://www.youtube.com/user/nasaads
- Code repository: https://github.com/adsabs/
- Like what you heard? Like coding? Talk to me, we are hiring!