Expansion Study and Proposals

Michael Kurtz & the ADS Team

ADS Users Group Meeting - 11/29/2018
Overview

● **Background and Motivation**
  - ADS Users Group Recommendation on Exoplanets
  - NASA’s Strategic Plan for Scientific Data and Computing
  - NASA’s Role in Search for Life in the Universe

● **Progress in 2018**
  - The ADS Information Model
  - Expanded exoplanet literature coverage
  - Submitted Whitepaper to Exoplanet 2020 Task Force
  - Solicited Planetary Expansion Proposal sent to NASA Astrophysics
  - Submitted NASA RFI input for NASA Archives Roles

● **Currently Pending**
  - Submission of whitepaper to Astro2020 Decadal Survey
  - Outcome of NASA Archives Plans
ADSUG Recommendation on Exoplanets

 ADSUG Nov. 2017 Report

During its first meeting, the ADSUG cited the growing importance and prevalence of exoplanet studies and the inevitable confluence of astronomy and planetary science in the literature and data archives. [...] 

As a first step, ADSUG recommends that ADS begin with a focused effort to improve coverage of exoplanets and related topics, ensuring complete coverage of exoplanets within the core content and services. This will provide a high-value return for the broadest user community at a modest cost to the agencies. This focused effort will also serve as an important proof-of-concept for the general expansion of the core to include Planetary Science.

ADS Users Group Report (Nov. 2017): "As a first step, ADSUG recommends that ADS begin with a focused effort to improve coverage of exoplanets and related topics, ensuring complete coverage of exoplanets within the core content and services. This will provide a high-value return for the broadest user community at a modest cost to the agencies. This focused effort will also serve as an important proof-of-concept for the general expansion of the core to include PS."

Citation analysis and feedback from Dawn Gelino and Carrie Anderson allowed us to greatly improve the ADS coverage of exoplanet literature and Planetary Science literature in general

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<th>Done</th>
<th>To do</th>
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| 1. Greatly improved coverage of PS literature (e.g. by adding missing journals to our CrossRef feed): *all current literature identified as crucial for exoplanet research is now discoverable through the ADS* (caveat: no full text for some journals)  
2. [Joint presentation](#) with PDS at 2018 meeting of Asia Oceania Geosciences Society  
3. [Presentation](#) at 2018 DPS meeting  
4. Participation at the 2018 AGU meeting (NASA booth) | 1. Approach publishers to provide us with full text.  
For example:  
- Ann Liebert Inc (Astrobiology)  
- Cambridge University Press (International Journal of Astrobiology, ...)  
- American Optical Society  
- American Meteorological Society  
- EGU/Copernicus (Annales Geophysicae, ...)  
2. Identify/fill gaps in older material*  
3. Additional citation analysis  
4. Liaise with PDS / ESA to improve linking datasets to PS literature |

* note: chemistry journals can only live in the ADS outer boundary
This Request for Information (RFI) invites comments and suggestions to assist NASA’s Science Mission Directorate (SMD) in the development of a new Strategic Plan for Scientific Data and Computing. Over the next five years the plan will be used to guide the evolution of the array of data and computing systems supporting research across four science areas: Astrophysics, Earth Science, Heliophysics and Planetary Science. This notice is published to solicit input from all stakeholders, including but not limited to members of scientific community, academic institutions, other agencies, the private sector, professional societies, advocacy groups, the general public, and international collaborators. Information gathered through this RFI will solely be used for strategic planning purposes and program development.
ADS RFI Response

- Facilitate crossing of silos
  - Literature can be seen as a central, organizing point to find, link to related resources
  - What ADS and the other archives do for Astro to be done for other disciplines
  - Adopt Data Citation across SMD (implies dataset registration)
  - Provide text mining services over the published literature to the larger SMD community using discipline-curated knowledge bases and thesauri
NASA’s Search for Life in the Universe

Jim Green (NASA PS):

“This interdisciplinary endeavor connects top research teams and provides a synthesized approach in the search for planets with the greatest potential for signs of life,” says Jim Green, NASA’s Director of Planetary Science. “The hunt for exoplanets is not only a priority for astronomers, it’s of keen interest to planetary and climate scientists as well.”

(https://www.nasa.gov/feature/nasa-s-nexss-coalition-to-lead-search-for-life-on-distant-worlds)

Paul Hertz (NASA AP):

“Just as we expected, there are exciting discoveries lurking in our archived Kepler data, waiting for the right tool or technology to unearth them,” said Paul Hertz, director of NASA’s Astrophysics Division in Washington. “This finding shows that our data will be a treasure trove available to innovative researchers for years to come.”


Thomas Zurbuchen (SMD):

"For astrobiology, the key thing to remember is that answering the fundamental question of “is there life out there?” will require scientific breakthroughs from many different science fields, including ones that are not currently engaged in this exciting endeavor. This, however, demonstrates the nature of great research: it’s not just about answering questions that have been asked in the past, it is about finding entirely new questions that will have impact for a long time to come."

Curation Levels of ADS Content

Three levels of curation:

- **Core**: Astronomy & Astrophysics
- **Inner ring**: related subject areas in Physics, Instrumentation
- **Outer ring**: content citing inner ring, multi-disciplinary journal articles
Curation Levels of ADS Content

Astrophysics

- Complete literature coverage: not just the refereed journals, but also books, conferences, reports, PhD thesis, the so called gray literature
- Substantial effort into collaborating with outside groups (CDS, NED, MAST, HEASARC, ESO, NASA HQ) to include high level data products, observing and funding proposals
- Work with data centers and archives to link papers in our database to the raw and reduced data behind them
Testing Weak Lensing Maps With Redshift Surveys: A Subaru Field

Michael J. Kurtz, Margaret J. Geller, Yousuke Utsumi, Satoshi Miyazaki, Ian P. Dell’Antonio, Daniel G. Fabricant

(Submitted on 28 Feb 2012 (v1), last revised 2 Apr 2012 this version, v2)

We use a dense redshift survey in the foreground of the Subaru GTO2deg2 weak lensing field centered at \(\alpha_{2000} = 16^h5^m4^s\; \delta_{2000} = +43^\circ26'24''\) (prime1244prime1prime15) to assess the completeness and comment on the purity of massive halo identification in the weak lensing map. The redshift survey (published here) includes 4541 galaxies; 4405 are new redshifts measured with the Hectospec on the MMT. Among the weak lensing peaks with a signal-to-noise greater that 4.25, 2/3 correspond to individual massive systems; this result is essentially identical to the Geller et al. (2010) test of the Deep Lens Survey field F2. The Subaru map, based on images in substantially better seeing than the DLS, enables detection of less massive halos than the DLS redshifts as expected. We demonstrate that the procedure adopted by Miyazaki et al. (2007) for removing some contaminated peaks from the weak lensing maps improves agreement between the lensing map and the redshift survey in the identification of candidate massive systems.

Bibliographic data
Select data provider: NASA ADS

References (51)

Citations (12)
Curation Levels of ADS Content

Inner Ring

- Documents which are likely to be used/cited by authors of documents in the core collection.
- Nearly every refereed article in physics, optics, geophysics and planetary science
- Many of the larger conference series from the major publishers (e.g. AIP)
- No attempt to curate this content at the same level of the core
- We do not seek the kind of close collaborations which we have in the bullseye core
Spin–orbit coupling assisted by flexural phonons in graphene


(Submitted on 19 Sep 2012 (v1), last revised 11 Dec 2012 (this version, v2))

We analyze the couplings between spins and phonons in graphene. We present a complete analysis of the possible couplings between spins and flexural, out of plane, vibrations. From tight-binding models we obtain analytical and numerical estimates of their strength. We show that dynamical effects, induced by quantum and thermal fluctuations, significantly enhance the spin–orbit gap.

References (29)

Citations (21)
Curation Levels of ADS Content

Outer Ring

- Documents which might be used or cited by authors of documents in the inner ring
- We only take these if it is very easy, essentially if the publisher provides them to us, or they are available from systems such as CrossRef and arXiv
- Includes content from multi-disciplinary journals (Nature, Science, PLOS, JOSS), arXiv CS, Math, some Zenodo records
- Apart from error checking we perform no curation on these documents
Usage Bibliometrics

Michael J. Kurtz, Johan Bollen
(Submitted on 14 Feb 2011)

Scholarly usage data provides unique opportunities to address the known shortcomings of citation analysis. However, the collection, processing and analysis of usage data remains an area of active research. This article provides a review of the state-of-the-art in usage-based informetric, i.e., the use of usage data to study the scholarly process.

References (157)
Data provided by Semantic Scholar

Jannine Day, Owen Vaughn

Maurice B. Uline

Citation analysis as a tool in journal evaluation. Science 1972
Eugene Garfield

Eugene Garfield

CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature [4] 2006
Chao-ming Chen

Citations (46)
Data provided by Semantic Scholar

Shenmeng Xu

Hers F. Friedman, Cali Halevi

Kim Shatz

"1. 2. 3. 4. 5. Import factors; target academic career destroyed?; just another statistical casualty." Journal Of Child Neurology 2012
Roger A. Brumberg

Altmetrics as traces of the computerization of the research process [9] ArXiv 2015
Hers F. Friedman
The number of articles mentioning the word “exoplanet” since the discovery of 51Peg b. Currently 6% of all refereed astronomy articles contain the word “exoplanet.”

A subject matter clustering of recent cited Planetary Science and Astrobiology literature from the 2017 papers discussing atmospheres of exoplanets.
Planetary Expansion Proposal

- Develop methodology for identifying relevant content which is not already in ADS through community engagement
- Perform in-depth analysis of (exo)planetary content through citation and topic analysis
- Identify additional partners and alternate data sources which should be incorporated in ADS bibliographic database
- Harvest and index relevant content
- Community outreach
- Text mining and metadata enrichment
- Interoperability
- UI development