

Integrating the UAT into the ADS

Alberto Accomazzi

aaccomazzi@cfa.harvard.edu

NASA Astrophysics Data System

Unified Astronomy Thesaurus Webinar | 8 December 2020



Improving Discovery in ADS with UAT

- Better Understand what the user is looking for
- Properly identify concepts discussed in papers
- Disambiguate meaning of words in corpus
- Leverage curated knowledge graph
- Provide better insights to users

Normalization

gamma-ray bursts

Gamma-ray bursts (629)

Gamma ray burst [Gamma-ray bursts (629)]

GRB [Gamma-ray bursts (629)]

Gamma ray bursts [Gamma-ray bursts (629)]

Gamma-ray burst [Gamma-ray bursts (629)]

$\hat{\Gamma}^3$ -ray bursts [Gamma-ray bursts (629)]

Cosmic gamma ray burst [Gamma-ray bursts (629)]

Cosmic gamma-ray burst [Gamma-ray bursts (629)]

Disambiguation

accretion

Galaxy accretion disks (562)

Galactic accretion disks [Galaxy accretion disks (562)]

Galaxy accretion discs [Galaxy accretion disks (562)]

Stellar accretion (1578)

Stellar accretion disks (1579)

Stellar accretion discs [Stellar accretion disks (1579)]

Accretion (14)

Particle accretion [Accretion (14)]

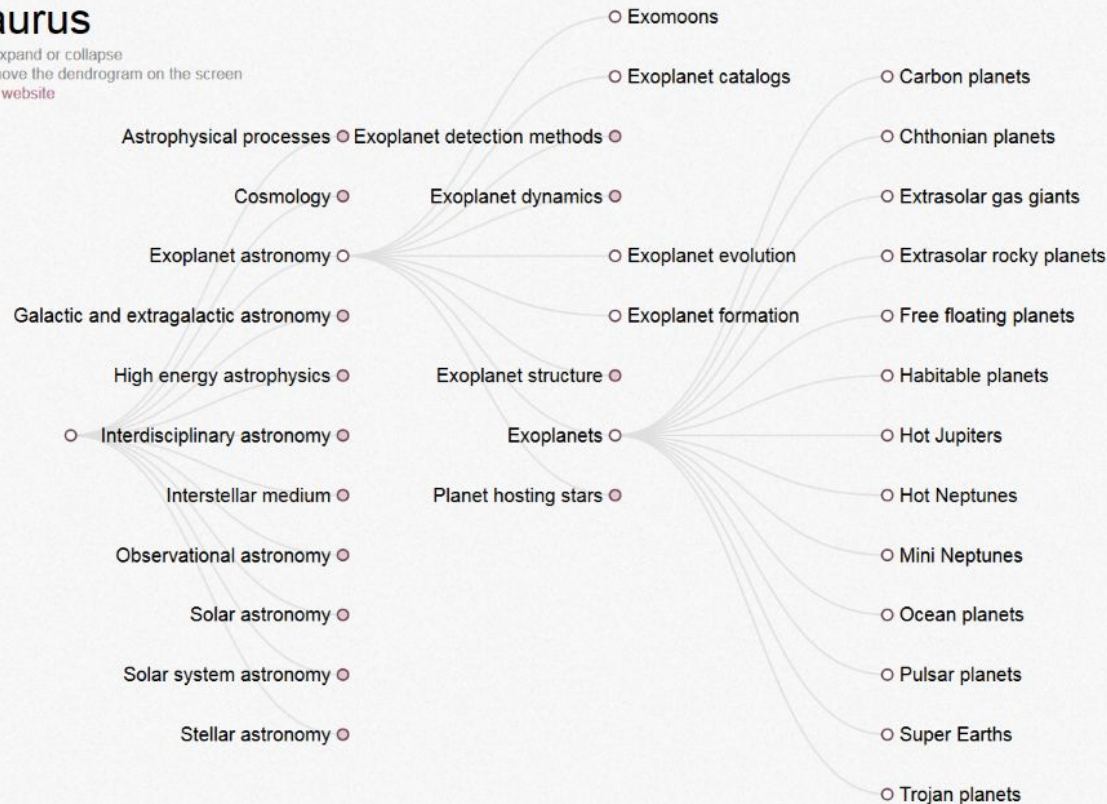
Galaxy accretion (575)

Bondi accretion (174)

Hierarchy

Unified Astronomy Thesaurus

click a node to expand or collapse
click & drag to move the dendrogram on the screen
[back to the UAT website](#)



What about subject heading keywords?

Incomplete: don't cover all subject areas

Subjective: assigned, not validated

Ambiguous: meaning not always grounded

Sparse: most ADS records don't have any

Not a good filter!

ads

Feedback ORCID About Account

QUICK FIELD: Author First Author Abstract Year Fulltext All Search Terms

Start New Search

"accretion disks"

Your search returned 33,805 results

Collection astronomy

Score Export Explore

Go To Bottom

1 1981ARA&A...19..137P 1981 cited: 1972
Accretion discs in astrophysics
Pringle, J. E.

2 1982MNRAS.199..883B 1982/06 cited: 2942
Hydromagnetic flows from accretion disks and the production of radio jets.
Blandford, R. D.; Payne, D. G.

3 1988ApJ...332..646A 1988/09 cited: 1179
Slim Accretion Disks
Abramowicz, M. A.; Czerny, B.; Lasota, J. P. and 1 more

4 1998RvMP...70....1B 1998/01 cited: 1905
Instability, turbulence, and enhanced transport in accretion disks
Balbus, Steven A.; Hawley, John F.

5 1980A&A....88...23P 1980/08 cited: 1163
Thick accretion disks and supercritical luminosities.
Paczýřsky, B.; Wiita, P. J.

6 1988MNRAS.232...35W 1988/05 cited: 539
Numerical simulations of accretion discs - I. Superhumps: a tidal phenomenon of accretion discs.
Whitehurst, Robert

7 1995ApJ...438L..37A 1995/01 cited: 638
Thermal Equilibria of Accretion Disks
Abramowicz, Marek A.; Chen, Xingming; Kato, Shoji and 2 more

8 1979ApJ...229..318G 1979/04 cited: 621
Structured coronae of accretion disks.

Collection astronomy

KEYWORDS

- accretion disks 16.2K
- accretion 12.3K
- astronomy x rays 7.6K
- astrophysics 6.5K
- black hole 5.4K
- physics 5.4K
- galaxies active 3.2K
- hydrodynamics 2.8K

REFEREED

- refereed 22k
- non-refereed 11.7k

COLLECTIONS

- astronomy 33.8k
- physics 2.9k
- general 315

AUTHORS

- Fabian, A 439
- Miller, J 365
- Chakrabarti, S 252
- Reynolds, C 251
- King, A 246

more

Years Citations Reads

■ refereed ■ non refereed

5k
4k
3k
2k
1k

1972-1976
1977-1981
1982-1986
1987-1991
1992-1996
1997-2001
2002-2006
2007-2011
2012-2016
2017-2021

Limit results to papers from

1972 to 2021 Apply

What about discovery?

Currently ADS collects and uses all keywords available for each paper

Since multiple keyword systems are in use, cross-linking papers not effective

Ideally, with wide UAT adoption and labeling:

1. All papers have UAT terms assigned
2. Concepts used for filtering, browsing
3. Papers cross-linked via UAT terms:

Galactic and extragalactic astronomy >

Galaxy Physics >

Galaxy Mergers (608)

Circumbinary Disks: Accretion and Torque as a Function of Mass Ratio and Disk Viscosity

Show affiliations

Duffell, Paul C.; D'Orazio, Daniel; Derdzinski, Andrea; Haiman, Zoltan; MacFadyen, Andrew; Rosen, Anna L.; Zrake, Jonathan

Using numerical hydrodynamics calculations and a novel method for densely sampling parameter space, we measure the accretion and torque on a binary system from a circumbinary disk. In agreement with some earlier studies, we find that the net torque on the binary is positive for mass ratios close to unity, and that accretion always drives the binary toward equal mass. Accretion variability depends sensitively on the numerical sink prescription, but the torque and relative accretion onto each component do not depend on the sink timescale. Positive torque and highly variable accretion occurs only for mass ratios greater than around 0.05. This means that for mass ratios below 0.05, the binary would migrate inward until the secondary accreted sufficient mass, after which it would execute a U-turn and migrate outward. We explore a range of viscosities, from $\alpha = 0.03$ to $\alpha = 0.15$, and find that this outward torque is proportional to the viscous torque, so that torque per unit accreted mass is independent of α . Dependence of accretion and torque on mass ratio is explored in detail, densely sampling mass ratios between 0.01 and unity. For mass ratio $q > 0.2$, accretion variability is found to exhibit a distinct sawtooth pattern, typically with a five-orbit cycle that provides a smoking gun prediction for variable quasars observed over long periods, as a potential means to confirm the presence of a binary.

Publication: The Astrophysical Journal, Volume 901, Issue 1, id.25, 9 pp.

Pub Date: September 2020

DOI: [10.3847/1538-4357/abab95](https://doi.org/10.3847/1538-4357/abab95)

arXiv: [arXiv:1911.01158](https://arxiv.org/abs/1911.01158)

Bibcode: [2020ApJ...901...25D](#)

Keywords: Galaxy mergers; Quasars; Supermassive black holes; Black holes; Circumstellar disks; Galaxy accretion disks; Binary stars; Active galactic nuclei; Wide binary stars; Astrophysical fluid dynamics; Close binary stars; Shocks; 608; 1319; 1663; 162; 235; 562; 154; 16; 1801; 101; 254; 2086; Astrophysics - Solar and Stellar Astrophysics; Astrophysics - Earth and Planetary Astrophysics; Astrophysics - Astrophysics of Galaxies; Astrophysics - High Energy Astrophysical Phenomena

E-Print [ApJ Accepted](#)

Comments:



FULL TEXT SOURCES

My Institution

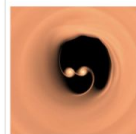
Publisher

arXiv



Add paper to library

GRAPHICS



Click to view more

From words to concepts: paper networks

Size wedges based on:

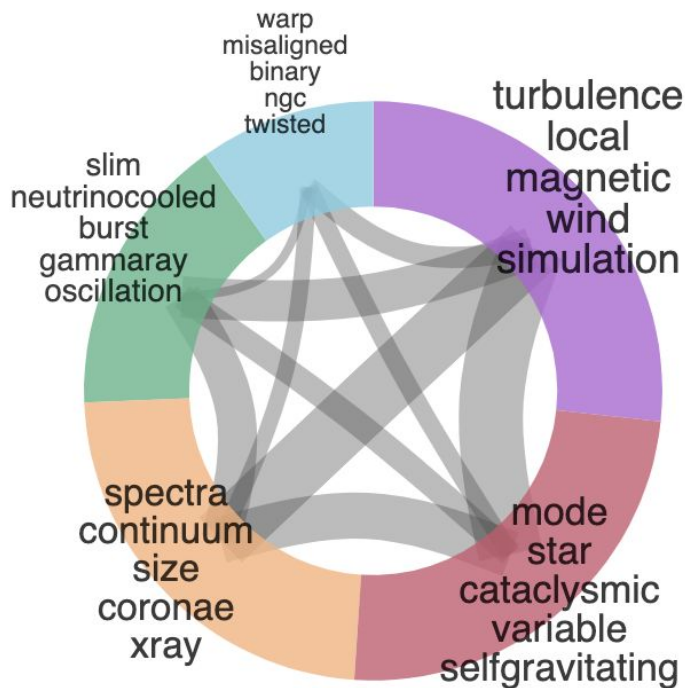
Number of Papers

Paper Citations

Paper Downloads

Summary

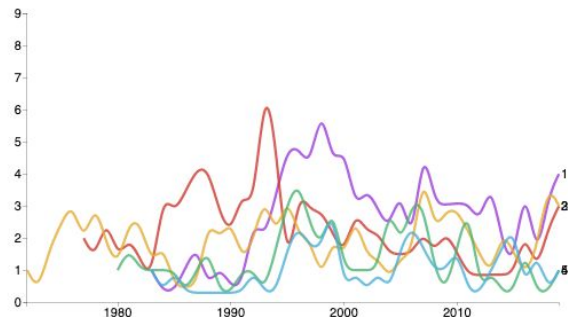
[Detail](#)



Paper Network for Query

The segments of the visualization to the left represent groups of papers from your result set which cite similar papers.

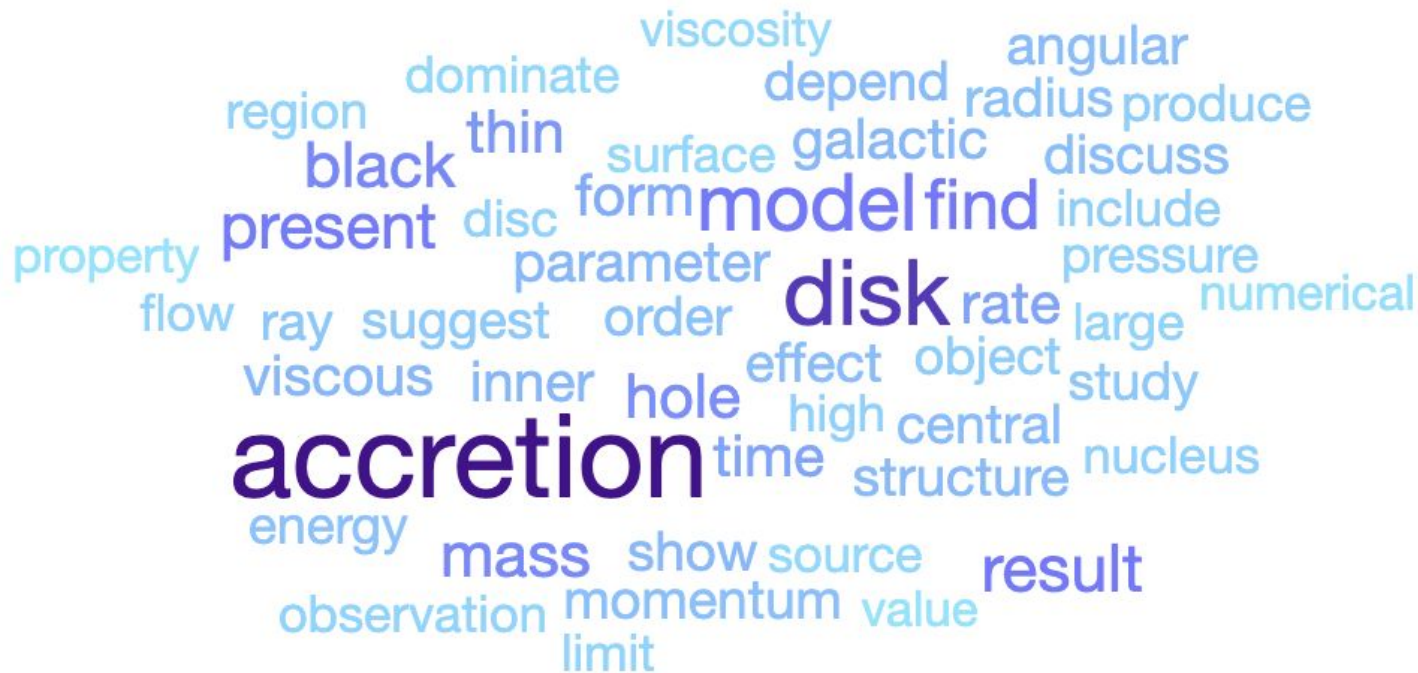
Group Activity Over Time (measured in papers published)



Click on a group to learn more about the papers within the group, as well as the papers cited by those papers.

[Learn more about the paper network.](#)

From words to concepts: word clouds



Plan

- Promote the use of the UAT as a the standard system for assigning concepts to Literature, Data, Software
- Start enabling cross-linking of papers with UAT concepts in ADS in 2021, increasing their exposure to the users
- Use Machine Learning techniques to automatically assign UAT concepts to prior literature
- Use UAT concepts rather than extracted keywords in ADS visualizations, analytics
- Extend system to use concepts drawn from other thesauri for content in other disciplines as appropriate