

Assigning UAT Keywords to Astronomy Literature in



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the Working Group on the UAT

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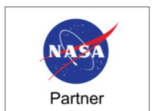
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LISA 10, 03 November 2025



CENTER FOR
ASTROPHYSICS
HARVARD & SMITHSONIAN



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QUICK FIELD: [author](#) [first author](#) [abstract](#) [year](#) [fulltext](#) all search terms


Search... 

Search Examples


author	author:"huchra, john"	citations	citations(abstract:JWST)
first author	first_author:"huchra, john"	refereed	property:refereed
abstract+title	abs:"dark energy"	collection	collection:astronomy
year	year:2000	exact search	=body:"reproducibility"
year range	year:2000-2005	institution	inst:NASA
full text	full:"super Earth"	record type	doctype:software
publication	pub:"The Astrophysical Journal"		




30M+
Scientific Documents



300M+
Citations



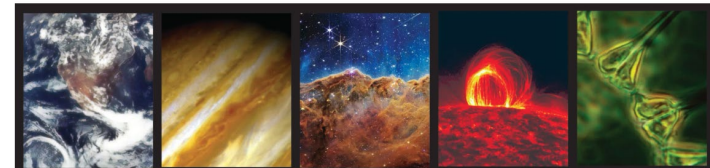
~8000
Peer Reviewed Journals



16M+
Annual Users

ADS for All NASA Science

- Astrophysics
- Planetary Science
- Heliophysics
- Earth Science
- NASA-funded research in Biological and Physical Sciences





UNIFIED ASTRONOMY THESAURUS

a community supported, open source project from the American Astronomical Society

- **Simple Knowledge Organization System (SKOS) ontology for astronomy**
 - Combines and expands earlier systems, including IAU thesaurus (1993)
 - Owned and freely licensed by the American Astronomical Society (AAS)
 - Open, community-contributed resource
 - Primarily astronomy concepts, increasing heliophysics & planetary science content
- **Keyword system for**
 - AAS journals
 - *Publications of the Astronomical Society of the Pacific* (PASP)
 - *Icarus*
 - International Virtual Observatory Alliance (IVOA)
 - Space Telescope Science Institute (STScI)
 - Strasbourg astronomical Data Center (CDS)



<https://astrothesaurus.org/>



<https://github.com/astrothesaurus/UAT>



UNIFIED ASTRONOMY THESAURUS

a community supported, open source project from the American Astronomical Society

Intergalactic medium

<https://astrothesaurus.org/uat/813>

Broader Concepts:

Extragalactic astronomy

Narrower Concepts:

Missing mass

Quasar absorption line spectroscopy

Dark matter

Intergalactic clouds

Intergalactic filaments

Intergalactic gas

Intergalactic medium phases

Voids

Related Concepts:

Astrophysical dust processes

Intracluster medium

Alternate Terms:

IGM

Intergalactic matter

Definition:

The matter or environment between the galaxies of a cluster.

- *An Etymological Dictionary of Astronomy and Astrophysics, by M. Heydari-Malayeri*

UAT at a Crossroads

Wolbach Library closing in March 2024 eliminated part-time UAT curator

- previously supported by CfA
- SciX absorbed some technical support responsibilities
- AAS reorganized management of project
- SciX & AAS funded temporary curation contract for knowledge transfer



AAS

Working Group on the UAT

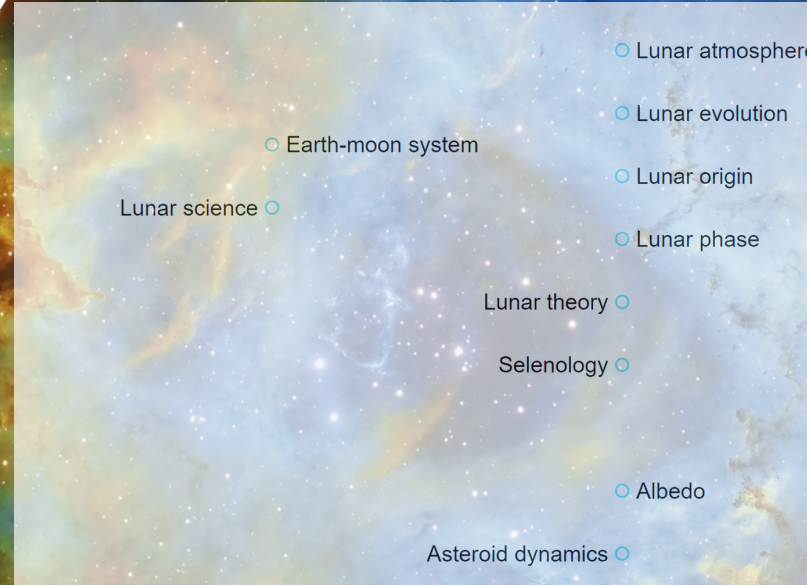
5 years to initiate strategic plan for thesaurus

- Released v. 5.1 summer 2024
- Anticipated v. 6.0 Dec. 2025, expanding heliophysics coverage
- Looking ahead 2026, further development of planetary science
- Investigating alternative curation models
- Modernizing technology infrastructure
- Seeking additional funding sources

Daniel Chivvis, member

Jennifer Lynn Bartlett, vice chair

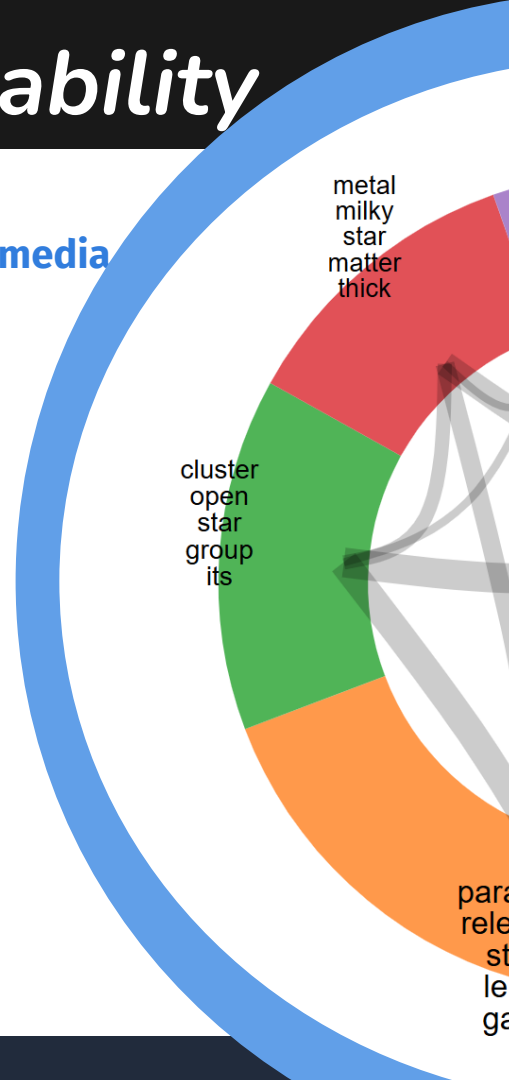
Nominations open!





UAT for Enhanced Discoverability

- **Potential to be single keyword system for space sciences regardless of media**
 - Consistent, controlled vocabulary for searching
 - Describes literature, datasets, and software
 - Relates concepts to one another in hierarchy for exploration
- **Potential to connect to other ontologies for cross-disciplinary search**
- **SciX (ADS) has promoted UAT use since 2013**
 - Goal: assign UAT keywords to all astronomy articles, including older pre-UAT articles, articles in journals that have not adopted the system, and articles whose authors are parsimonious
 - Supplement, not supplant, existing keywords
 - Keyword AI Labeler At Scix (KAILAS) is developmental AI algorithm



KAILAS: Keyword AI Labeler At Scix

KAILAS automatically assigns UAT keywords to astronomy papers.

- KAILAS is a RoBERTa-based model trained on the full text of ~425,00 astronomy papers (3+ million tokens) in our database that have been tagged by authors/publishers with UAT keywords
- The trained model, as well as future improvements, are publicly available: huggingface.co/adsabs/KAILAS
- A version of the dataset with only titles and abstract is publicly available for academic research: huggingface.co/datasets/adsabs/SciX_UAT_keywords
- Development follows publisher agreements

mount Kailas[h] from the Himalayas





KAILAS: Assessment Process

Input

TITLE: Ultrafast Variability in AGN Jets: Intermittency and Lighthouse Effect

ABSTRACT: Gamma-ray flares from active galactic nuclei (AGNs) show substantial variability on ultrafast timescales (i.e., shorter than the light-crossing time of the AGN's supermassive black hole). We propose that ultrafast variability is a by-product of the turbulent dissipation of the jet Poynting flux. Due to the intermittency of the turbulent cascade, the dissipation is concentrated in a set of reconnecting current sheets. Electrons energized by reconnection have a strong pitch-angle anisotropy, i.e., their velocity is [...]

Output

KAILAS ASSIGNED KEYWORDS:

blazars
active galactic nuclei
jets
relativistic jets
plasma astrophysics
high energy astrophysics
magnetic fields

Compare

AUTHOR ASSIGNED KEYWORDS:

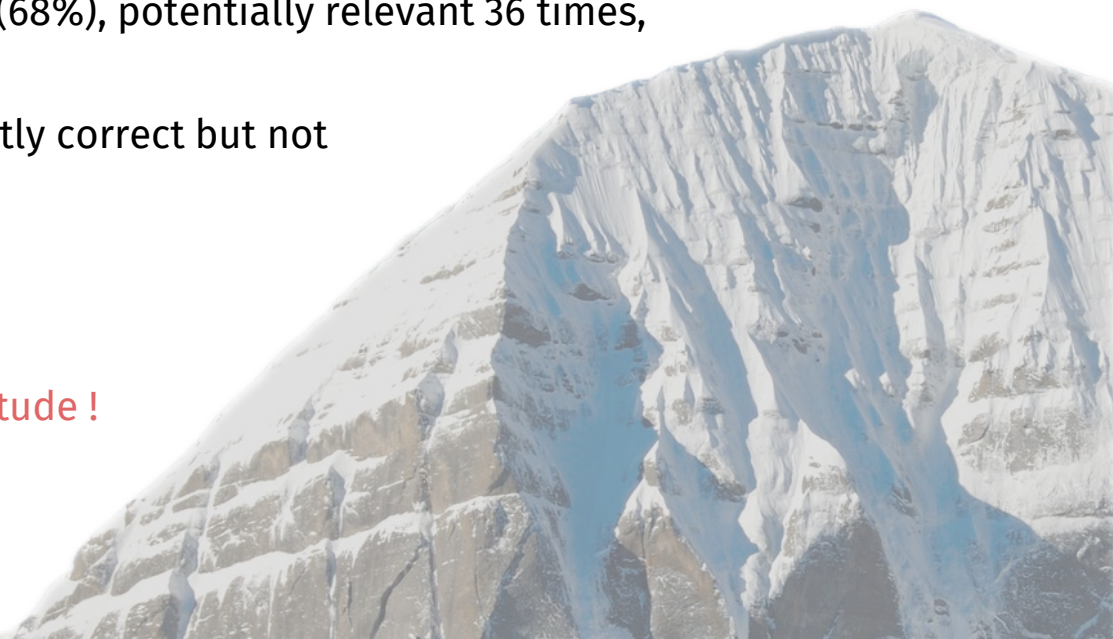
gamma-rays
blazars
galaxy jets



KAILAS: Assessment Results

Feedback from AAS Working Group on the UAT

- KAILAS v. 2 total of 77 papers + 1 control reviewed by 8 experts
- Keywords to be relevant 158 times (68%), potentially relevant 36 times, and wrong 39 times (17%).
- Keywords assigned are varied, mostly correct but not better than human yet
 - Author practices erratic
 - Uneven coverage
 - Poisoned training set - magnitude !
- More feedback desired!
- Assessment of v. 3 begun





KAILAS Keywords Abstract View

construct the spin evolution history of the pulsar over two decades and find that the pulsar spins-up during the outbursts but switches to spin-down state in the quiescent periods between the outbursts. Energy resolved pulse profiles generated in several bands in 0.5-80 keV show that the pulse shape varies with the energy. The energy spectrum of the pulsar is determined for the 2018 and 2021 outbursts. The best fit spectral models require presence of cyclotron resonant scattering feature at about 43 keV in the energy spectra of both the outbursts. We find indication of possible reversal in the correlation between the cyclotron line energy and luminosity which needs to be ascertained from future observations. Using the best fit spectra the X-ray luminosity of XTE J1946+274 is inferred to be 2.7×10^{37} erg s⁻¹ for the 2018 observations and 2.3×10^{37} erg s⁻¹ for the 2021 observations. We discuss possible mechanisms which can drive outbursts in this transient Be X-ray binary.

Publication	Research in Astronomy and Astrophysics, Volume 23, Issue 4, id.045003, 18 pp.
Publication Date	2023-04-00
DOI	10.1088/1674-4527/acb980 10.48550/arXiv.2301.10678
arXiv	arXiv:2301.10678
Bibcode	2023RAA....23d5003C

Keywords: [accretion](#) [accretion disks](#) [stars: neutron](#) [Be](#) [X-rays: bursts](#) [Astrophysics - High Energy](#)

UAT Keywords (generated) **BETA**: [high energy astrophysics](#) [high energy astrophysics](#) [high mass x-ray binary stars](#) [pulsars](#)

E-Print Comment(s): Accepted for publication in Research in Astronomy and Astrophysics; doi:10.1088/1674-4527/acb980

Broader, narrower, or related concepts to modify your query

Click magnifying glass to initiate new keyword search

Down caret opens list of other broader, narrower, or related concepts

Author or publisher keywords

Experimental KAILAS keywords

Click concept to access UAT API call

Make Corrections



Keywords Filtering of Results

▼ Refereed

- ☐ notrefereed 2.1k
- ☐ refereed 612

> Institutions

▼ Keywords

- ☐ astronomy x rays 585
- ☐ space vehicles 152
- ☐ mirrors 117
- ☐ instrumentation... 105
- ☐ space science 91
- ☐ telescopes 87
- ☐ astronomy visual 73
- ☐ techniques image... 61
- ☐ high resolution 51
- ☐ astrophysics 41

> Publications

> Bilgroups

> SIMBAD Objects

> NED Objects

> Data

> Vizier Tables

> Publication Type

▼ UAT

- ☐ x-ray telescopes 2.7k >
- ☐ grazing incidenc... 846 >
- ☐ x-ray detectors 568 >
- ☐ x-ray astronomy 379 >
- ☐ reflecting... 273 >
- ☐ space telescopes 190 >
- ☐ gamma-ray bursts 185 >
- ☐ gravitational wav... 151 >
- ☐ x-ray sources 136 >
- ☐ space vehicle... 111 >

1987/00 - Soft X-ray optics and technology - cited: 625

7 ☐ SN 2021gno: a calcium-rich transient with double-peaked light curves
Ertni, K.; Folatelli, G.; Martinez, L.; Bersten, M. C.; Anderson, J. P.; Ashall, C.; Baron, E.; Bose, S.; Brown, P. J.; Burris, C.; and 45 more
2023/11 - Monthly Notices of the Royal Astronomical Society - cited: 10

8 ☐ Lobster eyes as X-ray telescopes.
Angel, J. R. P.; show details
1979/10 - The Astrophysical Journal - cited: 146

9 ☐ SN 2019enk: A Double-peaked Ca-rich Transient with Luminous X-Ray Emission and Shock-ionized Spectral Features
Jacobson-Galán, Wynn V.; Margutti, Raffaela; Kilpatrick, Charles D.; Hiramatsu, Daichi; Perets, Hagai; Khatami, David; Foley, Ryan J.; Raymond, John; Yoon, Sung-Chul; Bobrick, Alexey; and 57 more
2020/08 - The Astrophysical Journal - cited: 63

10 ☐ High Hard X-Ray Polarization in Cygnus X-1 Confined to the Intermediate Hard State: Evidence for a Variable Jet Component
Chattopadhyay, Tanmoy; Kumar, Abhay; Rao, A. R.; Bhargava, Yash; Vadawale, Santosh V.; Ratheesh, Ajay; Dewangan, Gulab; Bhattacharya, Dipankar; Mithun, N. P. S.; Bhalariao, Varun; show details
2024/01 - The Astrophysical Journal - cited: 13

11 ☐ New constraints on light axion-like particles using Chandra transmission grating spectroscopy of the powerful cluster-hosted quasar H1821+643
Sisk-Reynés, Julia; Matthews, James H.; Reynolds, Christopher S.; Russell, Helen R.; Smith, Robyn N.; Marsh, M. C. David; show details
2022/02 - Monthly Notices of the Royal Astronomical Society - cited: 87

12 ☐ Handling the Background in IXPE Polarimetric Data
Di Marco, Alessandro; Soffitta, Paolo; Costa, Enrico; Ferrazzoli, Riccardo; La Monaca, Fabio; Rankin, John; Ratheesh, Ajay; Xie, Fei; Baldini, Luca; Del Monte, Ettore; and 11 more
2023/04 - The Astronomical Journal - cited: 94

13 ☐ The Circumstellar Environments of Double-peaked, Calcium-strong Transients 2021gno and 2021inl
Jacobson-Galán, W. V.; Venkatraman, P.; Margutti, R.; Khatami, D.; Terreran, G.; Foley, R. J.; Angulo, R.; Angus, C. R.; Auchettl, K.; Blanchard, P. K.; and 37 more
2022/06 - The Astrophysical Journal - cited: 28

14 ☐ The Lobster Eye Imager on the Japanese Orbital Satellite
Ling, Z. X.; Sun, X. J.; Zhang, C.; Sun, S. L.; Jin, G.; Zhang, S. N.; Zhang, X. F.; Chang, X. B.; Chen, F. J.; Chen, Y. J.; and 15 more
2023/09 - Research in Astronomy and Astrophysics - cited: 20

15 ☐ The Instrument of the Imaging X-Ray Polarimetry Explorer
Soffitta, Paolo; Baldini, Luca; Bellazzini, Ronaldo; Costa, Enrico; Latronico, Luca; Muleri, Fabio; Del Monte, Ettore; Fabiani, Sergio; Minuti, Massimo; Pinchera, Michele; and 71 more
2021/11 - The Astronomical Journal - cited: 106

Filter using author- or publisher-assigned keywords

Either require inclusion of likely concepts or exclusion of unlikely concepts

Filter using UAT keywords assigned by KAILAS



UAT Keyword Search Assistance



QUICK FIELD: [author](#) [first author](#) [abstract](#) [year](#) [fulltext](#)

uat:"asteroi

Asteroids

Asteroid, Minor planets

Asteroseismology

Astroseismology, Stellar seismology

Asteroid satellites

Asteroid moons, Binary asteroids, Binary systems, Multiple systems, Double asteroids, Satellites of asteroids, Minor planet moons, Binary small Solar System body systems, Multiple small Solar System body systems, Binary small Solar System bodies, Multiple small Solar System bodies, Multi-body asteroids, Binary SSSB systems, Binary SSSBs, Multiple SSSB systems, Multiple SSSBs, Multiple asteroids, Asteroid multiples

Asteroid belt

Asteroid occultation

Asteroid surfaces

Asteroid dynamics

Asteroid rotation

Trojan asteroids

Trojan group, Trojans

Main belt asteroids

UAT field searching is restricted to preferred labels

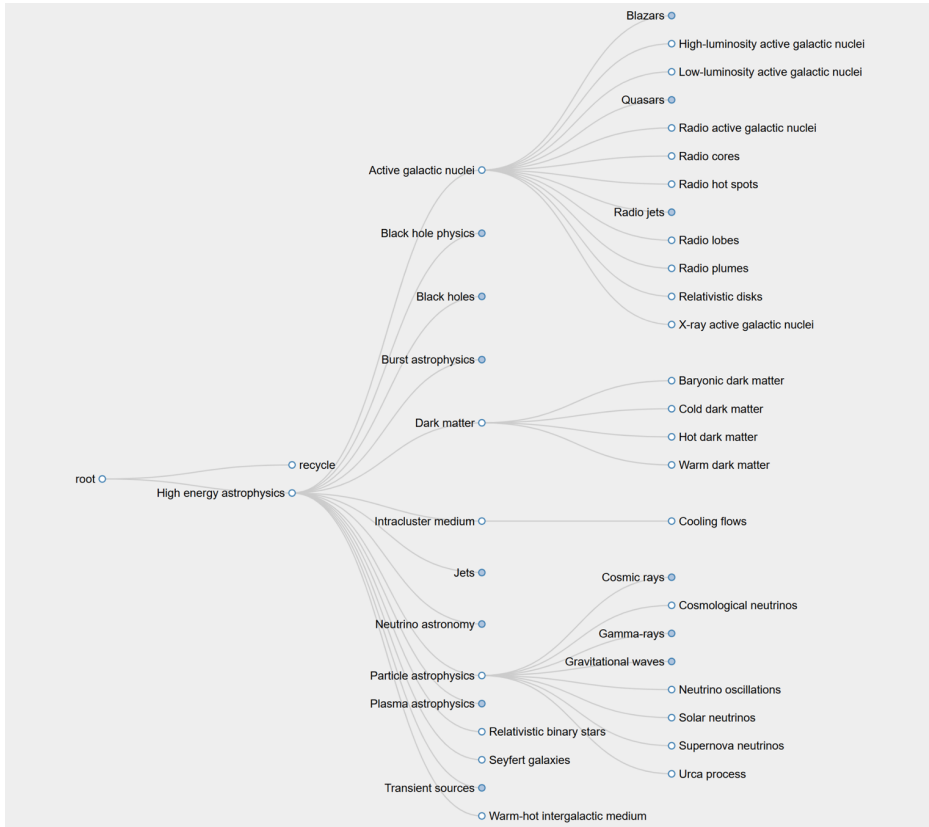
Suggests UAT concepts based on partial input

Lists all alternate labels so you can see what is most familiar to you

If input is similar to alternate label for UAT concept, suggests preferred label



Future UAT Exploratory Menu?



Still brainstorming what would be useful to explore the hierarchy



UNIFIED ASTRONOMY THESAURUS

a community supported, open source project from the American Astronomical Society

- **Use UAT concepts to describe your products**

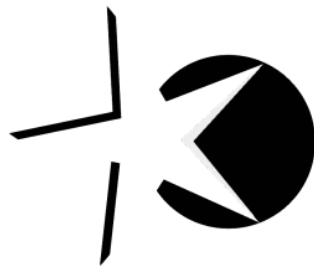
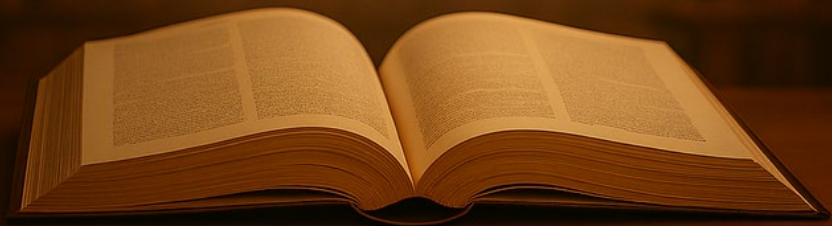
- Need a concept? Suggest it using GitHub Issues
- Concept not quite right? Modify it using GitHub Issues
- Other barrier? Talk to WG UAT

- **Improve UAT**

- Suggest improvements to existing concepts using GitHub Issues
- Provide definitions using GitHub Issues
- Volunteer to review concept suggestions
- Volunteer to review KAILAS assignments
- Nominations for WG open



question ask
examine inquire
interrogate investigate
challenge grill interview
quiz seek catechize
enquire probe pry



Questions?



SciX

[SciXplorer.org]