P.R. Young (2025, Sol. Phys., 300, 77)

HelioIndex.org

A Living Directory of Active Researchers in Solar and Heliospheric Physics

Dr. Peter Young (NASA GSFC & Northumbria University)

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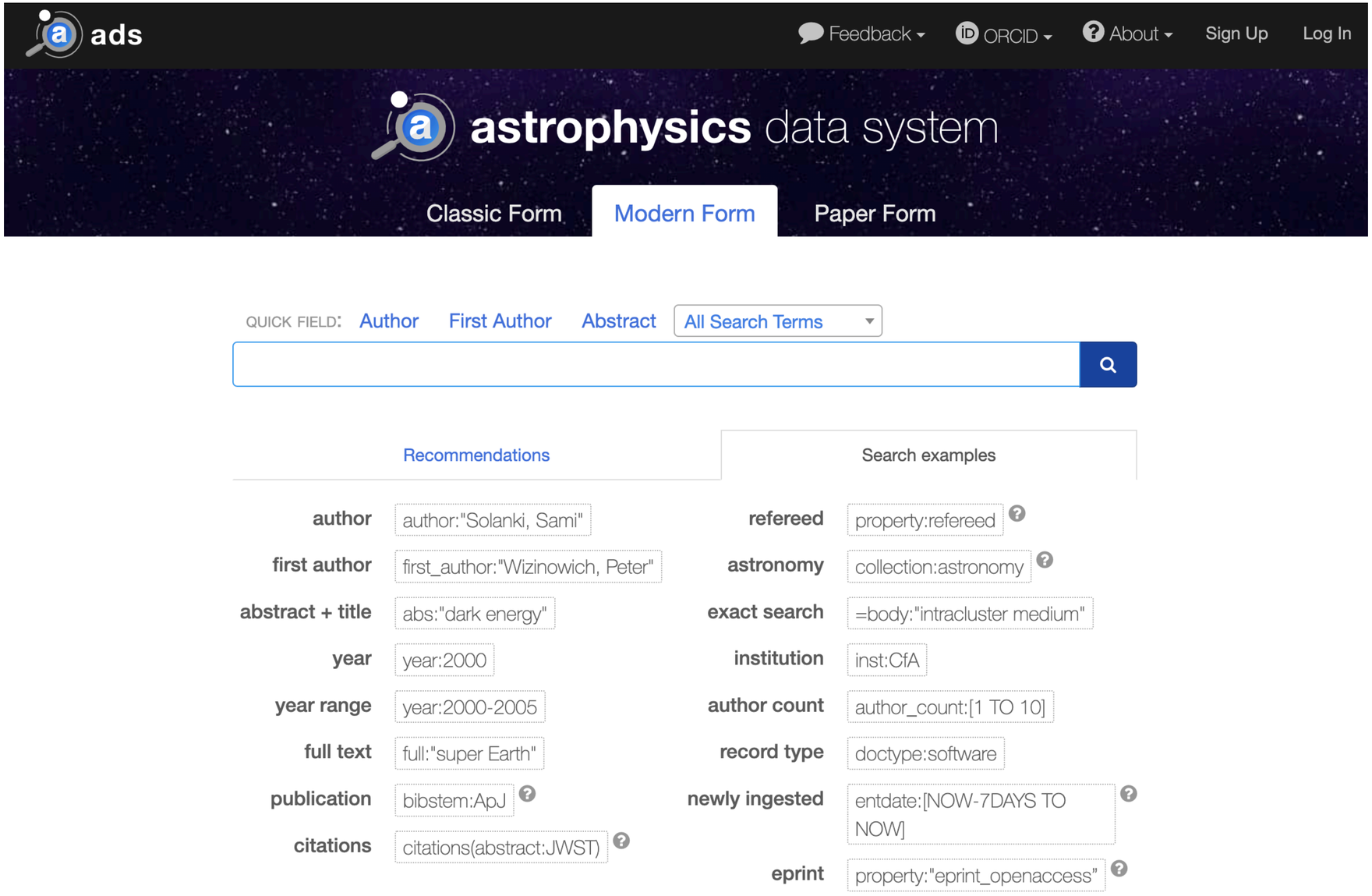
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author:"Solanki, Sami"
first author
first_author:"Wizinowich, Peter"
abstract + title
abs:"dark energy"
year
year:2000
year range
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Journal metadata

The Astrophysical Journal, 966:102 (12pp), 2024 May 1 https://doi.org/10.3847/1538-4357/ad37fc

The Temperature and Density of a Solar Flare Kernel Measured from Extreme-ultraviolet Lines of O IV

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Received 2023 December 15; revised 2024 March 15; accepted 2024 March 24; published 2024 April 29

Abstract

Previously unexplored diagnostics of O IV in the extreme-ultraviolet region 260–280 Å are used to derive a temperature and density for a solar flare kernel observed on 2012 March 9 with the Extreme-ultraviolet Imaging Spectrometer on the Hinode satellite. Seven lines from the $2s2p^2$–$2s2p3s$ transition array between 271.99 and 272.31 Å are both temperature- and density-sensitive relative to the line at 279.93 Å. The temperature, T, is constrained with the $\lambda 268.02/\lambda 279.93$ ratio, giving a value of $\log(T/\mathrm{K}) = 5.10 \pm 0.03$. The ratio $\lambda 272.13/\lambda 279.93$ then yields an electron number density, N_e, of $\log(N_e/\mathrm{cm}^{-3}) = 12.52$ with a lower limit of 11.90 and an upper limit of 14.40. The O IV emitting volume is estimated to be 0.″4 (300 km) across. Additional O IV lines at 196, 207, and 260 Å are consistent with the derived temperature and density but have larger uncertainties from the radiometric calibration and blending. Density diagnostics of O V and Mg VII from the same spectrum are consistent with a constant pressure of $10^{17.0}$ K cm^{-3} through the transition region. The temperature derived from O IV supports recent results that O IV is formed around 0.10 dex lower at high densities compared to standard *zero-density* ionization balance calculations.

Unified Astronomy Thesaurus concepts: Ultraviolet spectroscopy (2284); Solar transition region (1532); Solar flares (1496); Atomic data (2216); Solar flare spectra (1982)

Decadal Survey Report 2024

Recommendation 4-1: The National Aeronautics and Space Administration, the National Science Foundation, and the National Oceanic and Atmospheric Administration should fund either a professional organization (or group of organizations) or a team of researchers to develop a method to systematically gather demographic information of the current workforce in solar and space physics and obtain past demographic information (where possible) to assess demographic changes. A primary objective of this effort would be to initiate a sustainable structure for continuous, longitudinal data gathering, including at the level of undergraduate majors and conference attendees, to assess the potential future workforce and determine if the pool is sufficient to meet the needs of solar and space physics. Initial results should be provided in advance of the start of the midterm assessment of the present decadal survey.

Overview

- Walkthrough of the HelioIndex webpages.
- How HelioIndex is created.
- Additional topics not included in HelioIndex.
  - Which is the largest center of solar and heliospheric physics (SHP) in the US?
  - Mobility data for SHP scientists.
  - Assessing the health of SHP in the US.
- The future of HelioIndex.

https://helioindex.org

HelioIndex

A Directory of Active Researchers in Solar & Heliospheric Physics

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Created by Dr. Peter R. Young

HelioIndex is a directory of active researchers in Solar & Heliospheric Physics (SHP) that is regularly updated through automatic software procedures. It is derived from ORCID iDs and publication data obtained through ORCID and the the Astrophysics Data System.

The principal product of HelioIndex is the table below, which contains the list of SHP authors, together with their affiliations and the most common keywords linked to the authors' publications.

- **HelioIndex - Table of Authors**

The author table is updated on the 8th and 22nd of each month. The supplementary data below give additional information about the HelioIndex authors and their works.

The Table of Authors

Row	Name	Affiliation	Country	Field	Keywords	Links
1851	Beili Ying	Purple Mountain Observatory	China	S	Astrophysics - Solar And Stellar Astrophysics; Sun: coronal mass ejections; Sun: corona; Physics - Space Physics	ORCID, ADS Keywords, Affils.
1852	Yogesh	NASA Goddard	US	SH	Astrophysics - Solar And Stellar Astrophysics; Solar Wind; Sun: Activity; Sun: Abundances	ORCID, ADS Keywords, Affils.
1853	Takaaki Yokoyama	Kyoto University	Japan	S	Astrophysics - Solar And Stellar Astrophysics; Sun: Corona; Sun: Flares; Magnetohydrodynamics	ORCID, ADS Keywords, Affils.
1854	Peter H. Yoon	University of Maryland	US	H	Solar Wind; Waves; Plasmas; Instabilities	ORCID, ADS Keywords, Affils.
1855	E. Yordanova	Swedish Inst. of Space Physics	Sweden	H	Physics - Space Physics; Physics - Plasma Physics; Astrophysics - Solar And Stellar Astrophysics; Solar Wind	ORCID, ADS Keywords, Affils.
1856	Peter R. Young	NASA Goddard	US	S	Astrophysics - Solar And Stellar Astrophysics; Sun: Corona; Sun: Uv Radiation; Sun: Transition Region	ORCID, ADS Keywords, Affils.
1857	D. J. Yu	Kyung Hee University	Rep. Korea	SH	Astrophysics - Solar And Stellar Astrophysics; Sun: Oscillations; Magnetohydrodynamics; Physics - Plasma Physics	ORCID, ADS Keywords, Affils.
1858	Fu Yu	Purple Mountain Observatory	China	S	Sun: magnetic fields; Sun: Filaments; Sun: corona; Astrophysics - Solar And Stellar Astrophysics	ORCID, ADS Keywords, Affils.
1859	Ke Yu	Sichuan Normal University	China	S	Astrophysics - Solar And Stellar Astrophysics; Sun: flares; Sun: corona; Solar Ultraviolet Emission	ORCID, ADS Keywords, Affils.

Start	End	Country	Affiliation
2019	Present	US	NASA Goddard
2017	2018	US	George Mason University
2009	2010	US	Naval Research Laboratory
2005	2009	UK	Rutherford Appleton Laboratory
2000	2005	US	Harvard-Smithsonian CfA
1997	2000	UK	University of Cambridge

Sample of table

Author's publications

Publications of Peter R. Young

A list of publications authored or co-authored by Peter R. Young, derived from the SAO/NASA Astrophysics Data System (ADS). The number in brackets after each title indicates the number of citations that the paper has received.

Orcid ID: 0000-0001-9034-2925

List of publications ordered by citations
Number of papers: 165 (refereed: 138)
No. of citations: 11367
First author papers: 56 (refereed: 41)

List of first-author refereed (FAR) papers

2024

1. Hard X-rays from the deep solar atmosphere. An unusual UV burst with flare properties [0]
   Chitta, L. P., Hannah, I. G., Fletcher, L., Hudson, H. S., Young, P. R., Krucker, S. & Peter, H., A&A, 688, L9
2. CHIANTI—An Atomic Database for Emission Lines—Paper. XVIII. Version 11, Advanced Ionization Equilibrium Models: Density and Charge Transfer Effects [2]
   Dufresne, R. P., Del Zanna, G., Young, P. R., Dere, K. P., Deliporanidou, E., Barnes, W. T. & Landi, E., ApJ, 974, 71
3. Center-to-limb Variations in Solar Plage Using IRIS Observations [1]
   Kayshap, Pradeep & Young, Peter R., ApJ, 977, 141
4. Applications of atomic data to studies of the Sun [1]
   Young, Peter R., European Physical Journal D, 78, 130
5. The Temperature and Density of a Solar Flare Kernel Measured from Extreme-ultraviolet Lines of O IV [0]
   Young, Peter R., ApJ, 966, 102

Other HelioIndex pages

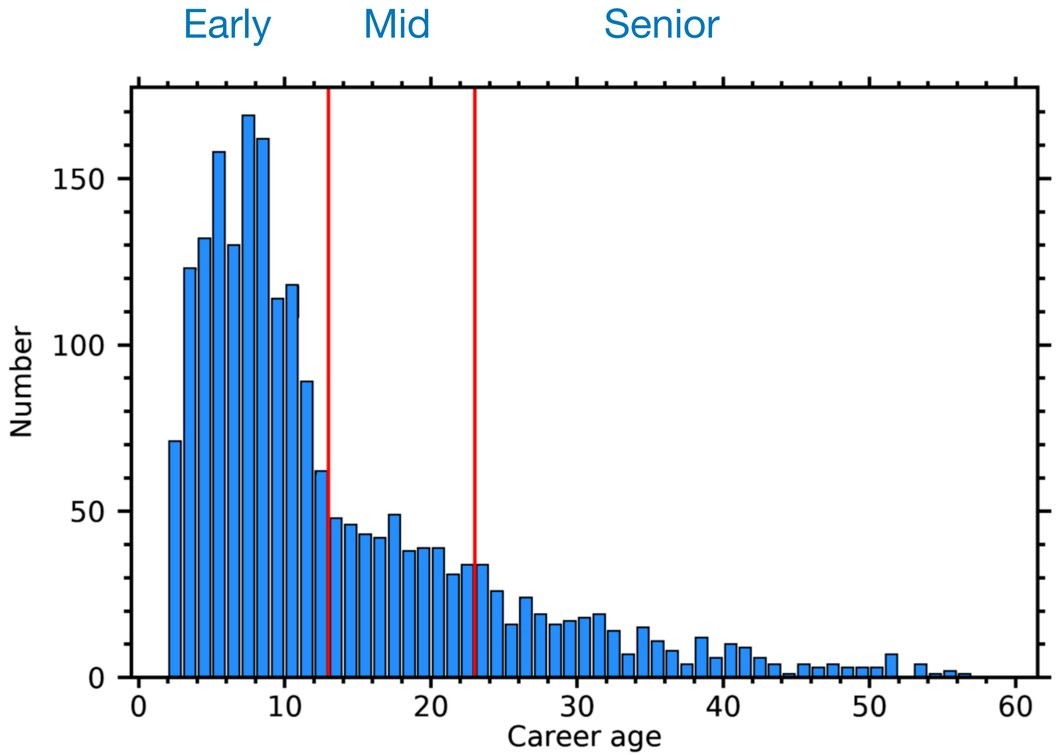
- General statistics for HelioIndex authors
- Country affiliations for HelioIndex authors
- Institutes with the most HelioIndex authors
- HelioIndex journal statistics for the past 10 years
- Most-cited papers by HelioIndex authors of the past 10 years
- *Nature* and *Science* papers written by HelioIndex authors

General Statistics

Statistic	Result
No. of authors	2070
No. of FAR papers	19091
No. of FAR citations	579474
Average citations per paper	30
Median citations per paper	14
Mean FAR papers per year	0.68
Median career age	9.7
Early career researchers	64.2%
Mid-career researchers	19.8%
Senior researchers	16.1%

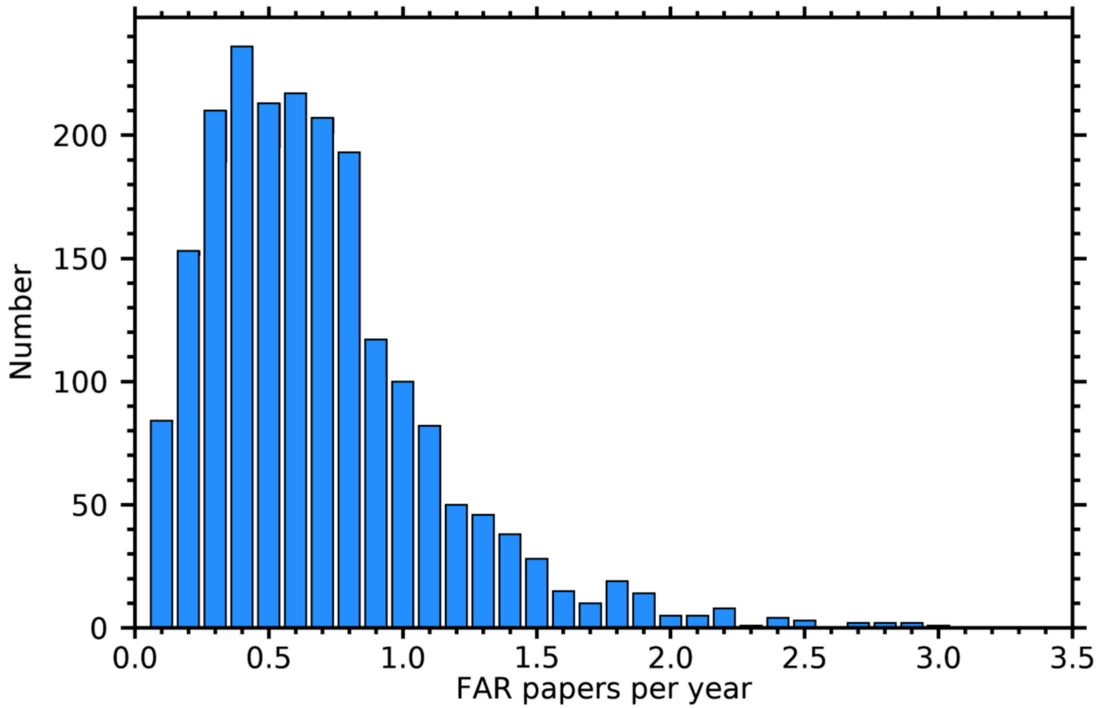
Career Age

- Career age calculated from date of first FAR paper plus 6 months (the latter is included as preparation time).
- Date of award of thesis is estimated from (career age - 2).
- Use SPD definitions of early/mid/senior career stages (based on thesis award date).
- Incomplete ORCID publication records lead to an excess of early-career researchers.



FAR papers per year

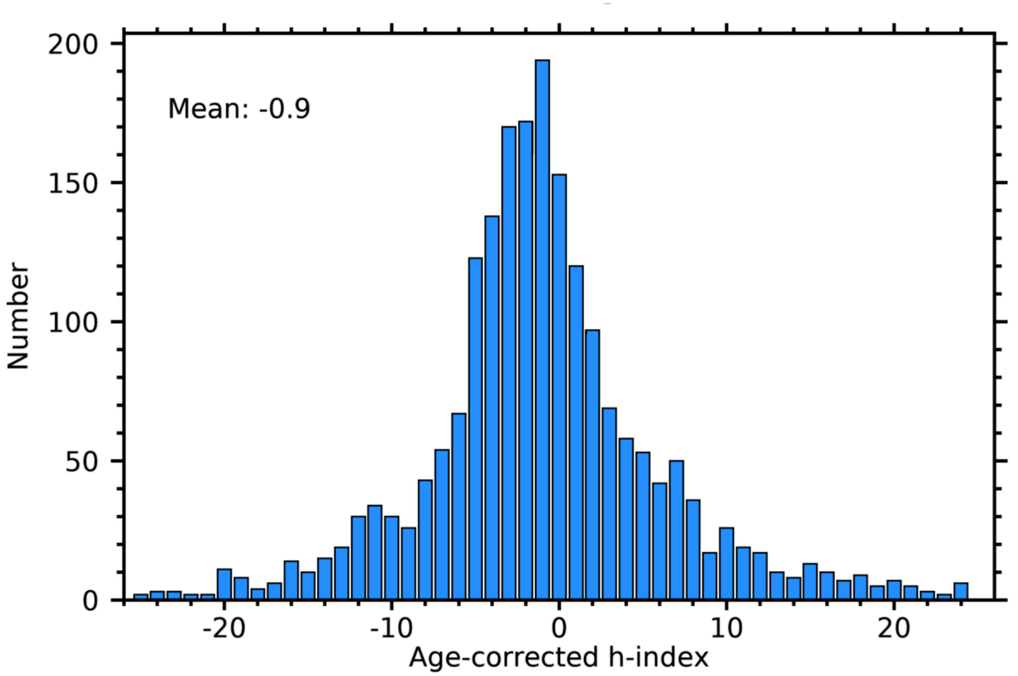
- SHP researchers write 0.68 FAR papers per year.
- That is, about two papers every three years.
- This is useful for managing expectations in SHP.
  - *How many papers will my postdoc write?*
  - *How many papers will my ROSES proposal yield?*



- 19% of researchers write one or more papers per year
- 1.6% of researchers write two or more papers per year

Age-subtracted h-index

- The *h*-index is often used as a measure of the success of a scientist.
- One measure is *h*-index ≥ career age.
- On average, the *h*-indices for SHP researchers lag their career ages by 0.9.



38% of researchers have *h*-index ≥ career age

Publication affiliations

- Researchers give their affiliations in their published work.
- For HelioIndex, the primary affiliation for the most recent publication is processed to yield the country and institute.
- These are listed on the researcher's directory entry.

Applications of atomic data to studies of the Sun

Peter R. Young[1,2,a]

[1] Heliophysics Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
[2] Department of Mathematics, Physics and Electrical Engineering, Northumbria University, Newcastle Upon Tyne NE1 8ST, UK

NASA Goddard, US

Country demographics

Total number of countries: 61

Country	No. of authors	%age of total	Median career age
All	2070	100%	9.7
US	586	28.3%	**9.4**
China	297	14.3%	**8.0**
UK	157	7.6%	10.8
Italy	99	4.8%	16.3
Germany	97	4.7%	10.1
India	85	4.1%	**7.3**
Russia	74	3.6%	12.7
Spain	67	3.2%	12.2
Japan	59	2.9%	**8.7**
France	58	2.8%	**9.0**
Belgium	49	2.4%	**7.9**
Finland	38	1.8%	10.9
Rep. Korea	37	1.8%	10.2

The most recent country affiliation is a proxy for where the researcher is working now.

Country demographics

Countries with a single researcher

Slovenia	1	0.0%	-
Azerbaijan	1	0.0%	-
Israel	1	0.0%	-
Iraq	1	0.0%	-
Malaysia	1	0.0%	-
Nepal	1	0.0%	-
Nigeria	1	0.0%	-
Georgia	1	0.0%	-
Pakistan	1	0.0%	-
Ethiopia	1	0.0%	-
Denmark	1	0.0%	-
Qatar	1	0.0%	-
Colombia	1	0.0%	-
Canada	1	0.0%	-
Burkina Faso	1	0.0%	-
Kuwait	1	0.0%	-

Institute demographics

23 civil servants

No. of authors	Institute	Country	Median age
61	NASA Goddard	US	10.6
42	MPS - Gottingen	Germany	13.4
36	Purple Mountain Observatory	China	8.4
33	KU Leuven	Belgium	8.5
30	National Solar Observatory	US	14.4
27	Yunnan Observatories	China	9.8
27	Southwest Research Institute	US	9.7
26	University of Oslo	Norway	9.6
26	NAOC	China	12.4
26	National Space Science Center	China	10.9
25	NJIT	US	8.8
24	Harvard-Smithsonian CfA	US	13.1
23	Univ. of Alabama, Huntsville	US	10.2
22	MSSL	UK	8.4
22	SSL, Berkeley	US	9.1
21	University of Michigan	US	10.5
21	IAC - Tenerife	Spain	11.7
20	University of New Hampshire	US	10.5

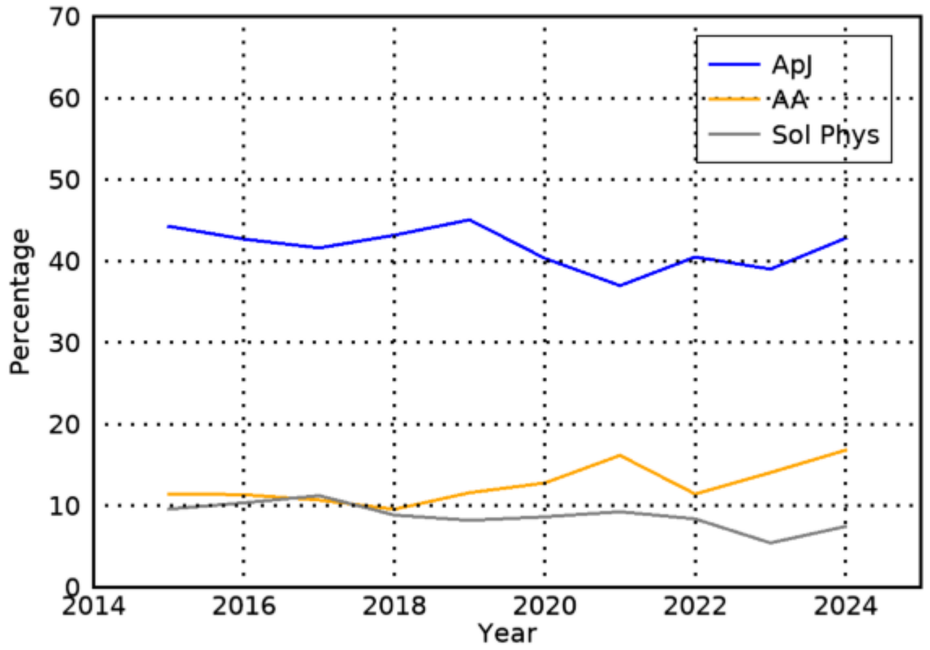
Institutes with 20 or more HelioIndex members

Journal Statistics

Journal statistics for 2024

Total number of articles: 1058

Journal	No. of articles	Percentage
The Astrophysical Journal	453	42.8%
Astronomy and Astrophysics	178	16.8%
Solar Physics	79	7.5%
Monthly Notices of the Royal Astronomical Society	37	3.5%
Journal of Geophysical Research (Space Physics)	34	3.2%
The Astrophysical Journal Supplement Series	18	1.7%
Geophysical Research Letters	16	1.5%
Space Weather	16	1.5%



These are the journals that publish HelioIndex authors' FAR papers

Nature & Science articles

Total number of Nature papers: 43
Total number of Science papers: 36
Median citations: 109

Year	Journal	Author	Title	Citations
2024	Science	Zihao Yang	Observing the evolution of the Sun's global coronal magnetic	4
2024	Science	Yeimy J. Rivera	In situ observations of large-amplitude Alfven waves heatin	19
2023	Science	L. P. Chitta	Picoflare jets power the solar wind emerging from a coronal	37
2023	Nature	Stuart D. Bale	Interchange reconnection as the source of the fast solar win	72
2023	Nature	Tomi K. Baikie	Photosynthesis re-wired on the pico-second timescale	15
2022	Nature	Gregory D. Fleishman	Solar flare accelerates nearly all electrons in a large coro	63
2020	Science	Zihao Yang	Global maps of the magnetic field in the solar corona	123
2020	Science	Gregory D. Fleishman	Decay of the coronal magnetic field can release sufficient e	115
2019	Science	T. Samanta	Generation of solar spicules and subsequent atmospheric heat	126
2019	Nature	Stuart D. Bale	Highly structured slow solar wind emerging from an equatoria	466
2019	Nature	Russell A. Howard	Near-Sun observations of an F-corona decrease and K-corona f	92
2019	Nature	David J. McComas	Probing the energetic particle environment near the Sun	109
2018	Science	Donald G. Mitchell	Dust grains fall from Saturn's D-ring into its equatorial up	36
2018	Nature	T. D. Phan	Electron magnetic reconnection without ion coupling in Earth	291
2017	Science	Juan Martinez-Sykora	On the generation of solar spicules and Alfvenic waves	153
2016	Science	H. Hotta	Large-scale magnetic fields at high Reynolds numbers in magn	102

Most-cited articles

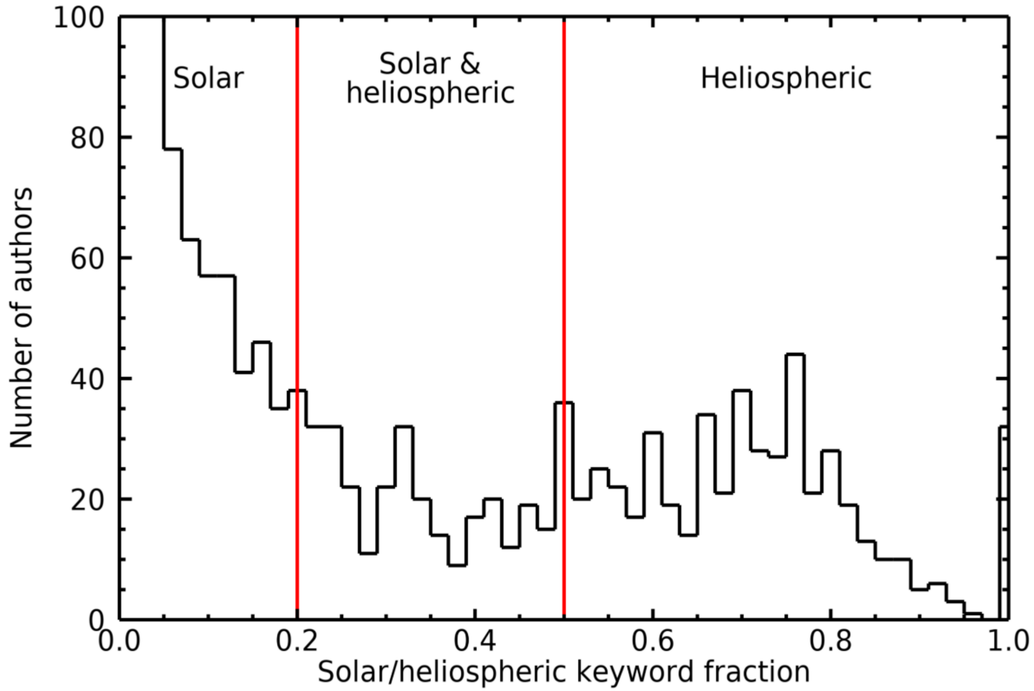
HelioIndex: most-cited articles of 2015 to 2024

No. citations	Year	Bibcode	First author	Title
749	2020	2020A&A...642A...1M	Daniel Muller	The Solar Orbiter mission. Science overview
671	2016	2016SSRv..204...49B	Stuart D. Bale	The FIELDS Instrument Suite for Solar Probe Plus. Measuring
533	2016	2016SSRv..204..131K	Justin Kasper	Solar Wind Electrons Alphas and Protons (SWEAP) Investigatio
473	2019	2019Natur.576..237B	Stuart D. Bale	Highly structured slow solar wind emerging from an equatoria
398	2016	2016ApJ...831...18C	Alan C. Cummings	Galactic Cosmic Rays in the Local Interstellar Medium: Voyag
346	2017	2017LRSP...14....2B	Arnold O. Benz	Flare Observations
312	2018	2018JSWSC...8A..35P	Jens Pomoell	EUHFORIA: European heliospheric forecasting information asse
307	2017	2017LRSP...14....5K	Emilia K. J. Kilpua	Coronal mass ejections and their sheath regions in interplan
301	2017	2017LRSP...14....3U	Ilya Usoskin	A history of solar activity over millennia
295	2018	2018Natur.557..202P	T. D. Phan	Electron magnetic reconnection without ion coupling in Earth
292	2016	2016SSRv..201....1R	Nour E. Raouafi	Solar Coronal Jets: Observations, Theory, and Modeling
290	2021	2021ApJ...909...38D	Giulio Del Zanna	CHIANTI—An Atomic Database for Emission Lines. XVI. Versio
288	2019	2019LRSP...16....5V	Daniel Verscharen	The multi-scale nature of the solar wind
284	2020	2020A&A...642A...8R	P. Rochus	The Solar Orbiter EUI instrument: The Extreme Ultraviolet Im
281	2015	2015ApJ...798..135B	Monica G. Bobra	Solar Flare Prediction Using SDO/HMI Vector Magnetic Field D
277	2015	2015ApJ...806..167G	Fan Guo	Particle Acceleration and Plasma Dynamics during Magnetic Re
262	2015	2015AdSpR..55.2745S	Carolus J. Schrijver	Understanding space weather to shield society: A global road

HelioIndex lists the most-cited articles for each of the last 10 years, plus the most-cited articles for the past 5 years, and past 10 years.

Separating solar from heliospheric

Solar (S)	56.2%
Heliospheric (H)	28.4%
Both (SH)	15.4%



- Identify two lists of keywords unique to solar physics and heliospheric physics.
- For each author, compute $f=n_{\mathrm{helio}}/(n_{\mathrm{solar}}+n_{\mathrm{helio}})$.

What is the purpose of HelioIndex?

- Provides an up-to-date snapshot of who is working in community.
- Provides demographic data (location, age) for the community.

How can the data be used?

- Help young researchers identify job opportunities.
- Search for collaborators in your research area.
- Identify reviewers for proposals and papers.
- Input for assessment activities (e.g., Decadal Survey).

Accuracy and reliability of HelioIndex data

Advantages of using publication data:

- Data are accurate (researchers take care over their papers).
- Data are open.

Disadvantages

- Data may be out-of-date if researchers have recently changed institute.
- ORCID records are often incomplete.

Creating HelioIndex

1. Perform searches of the ADS to identify SHP articles, and extract the ORCID iDs of the articles' authors.
2. For each ORCID iD, download the publication data from the ORCID website and ADS that is related to the iD.
3. From the publication data, identify SHP authors based on publication and article keyword data.
4. Construct an online database of SHP authors that includes affiliation information and publication statistics.

Publication criteria

To become a HelioIndex author, you need

i. At least one refereed paper in the last 3 years.

ii. At least one FAR paper in your career.

iii. Your career age must be at least 2 years.

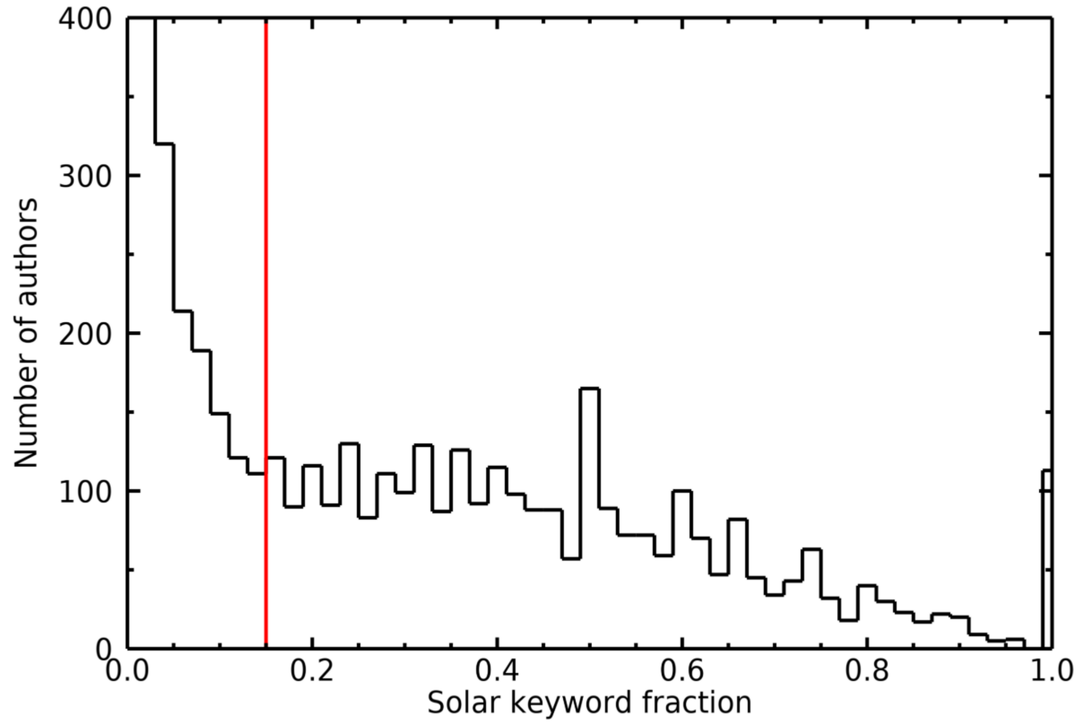
iv. You must have 6 “points,” where FAR papers count as 2 points, and co-author papers as 1 point.

Criteria (ii)-(iv) are intended to exclude PhD students.

Keyword criteria

In addition to the publication criteria…

- at least 15% of the author's keywords should contain one of "sun," "solar," or "interplanetary."



Update schedule

- The masterlist of authors (around 8000) is updated on the 1st and 15th of each month.
- Publication data for the masterlist authors are updated on a rolling 180 day schedule.
- Publication data for the HelioIndex authors (around 2000) are updated on a rolling 45 day schedule.
- The HelioIndex webpages are updated on the 8th and 22nd of each month.

Note that ADS limits how many queries can be submitted each day.

Boulder vs. DC

- The DC area and Boulder have the largest concentrations of SHP researchers in the US.

	Boulder	**DC**
Number	107	122
%age of US	18%	21%
Median age	10.8	10.3
Mean FAR papers/year	0.63	0.73

Scientist Mobility Data

Country	No. of authors for final paper	No. of authors for first paper	Difference	Percentage
US	586	423	-163	-28%
China	297	328	31	10%
UK	157	159	2	1%
Italy	99	111	12	12%
Germany	97	89	-8	-8%
India	85	147	62	73%
Russia	74	96	22	30%
Spain	67	76	9	13%
Japan	59	72	13	22%
France	58	83	25	43%

Location where scientists are currently working

Location where scientists are trained

US health assessment: universities

- Many US scientists work outside of universities, especially in solar physics.

	%age in universities
Solar	37%
Heliospheric	56%
Solar (UK)	88%
Heliospheric (UK)	66%

Excluding APL, LASP, SSL and MSSL

	%age in universities
Solar	44%
Heliospheric	69%
Solar (UK)	97%
Heliospheric (UK)	90%

Including APL, LASP, SSL and MSSL

Where do early career researchers come from?

- Identify country in which early career researchers write their first paper.

Country	No. of people
China	150
US	129
India	77
UK	55
Germany	30
Russia	27

Solar Physics

Country	No. of people
US	121
China	88
UK	30
France	28
Italy	23
India, Germany	14

Heliospheric Physics

Assessing the health of US science

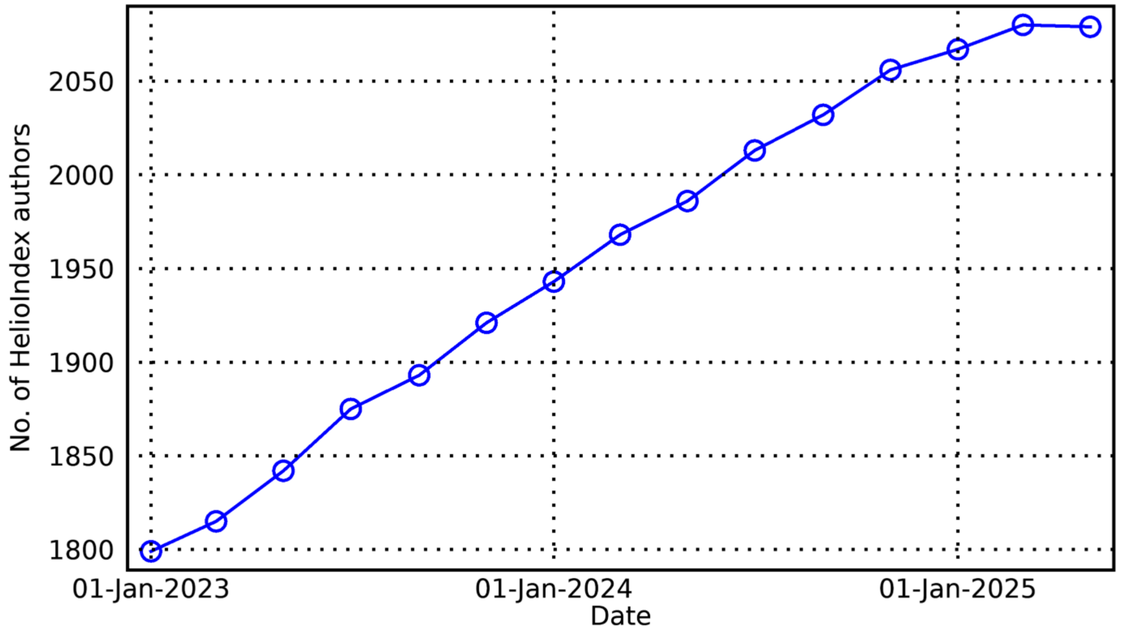
- The US has proportionally less solar physicists than many other countries

	Solar physicists	Heliospheric physicists
World	56%	28%
World (non-US)	60%	25%
US	47%	36%
China	62%	28%
UK	64%	26%
Germany	71%	21%
Italy	31%	39%
India	76%	16%

Is the lack of solar physics in universities leading to a decline in US solar physics?

The Future of HelioIndex

- Extending to all of Heliophysics.
  - Keyword analysis requires some work (input from experts).
  - Is ADS complete for Earth sciences?
- Provide trends for key parameters as a function of time (e.g., number of authors).



What can you do for HelioIndex?

- Check that your ORCID iD is attached to all of your publications.
- Is your field designation (S,H,SH) correct?
- Are any of your colleagues/collaborators missing?
- Look for any errors in affiliation mapping.