RAWR

Make your research software famous!
(or at least discoverable)

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Abstract

Abstract: Source codes are increasingly important for the advancement of science in general and astrophysics in particular. Journal articles detail the general logic behind new results and ideas, but often the source codes that enable these results remain hidden from public view. In this presentation, I will discuss our recent study on the availability of source codes used for published research and how this affects the transparency and reproducibility of astro research; I will also share initial results of our recent work on making NASA astro research software easier to find and to cite. I will cover what the Astrophysics Source Code Library (ASCL, ascl.net) is and the benefits of submitting your software to it, how ASCL entries are indexed by ADS, the links between literature and software entries, and how an ASCL ID can be used for citing your code. I will also share some of the ways journals are changing to include and recognize the contribution software makes to our discipline.

Software is the most used instrument in astronomy

Schroedinger's Code

It's not until you open the box that you know whether the code is alive or dead.

We opened the boxes…

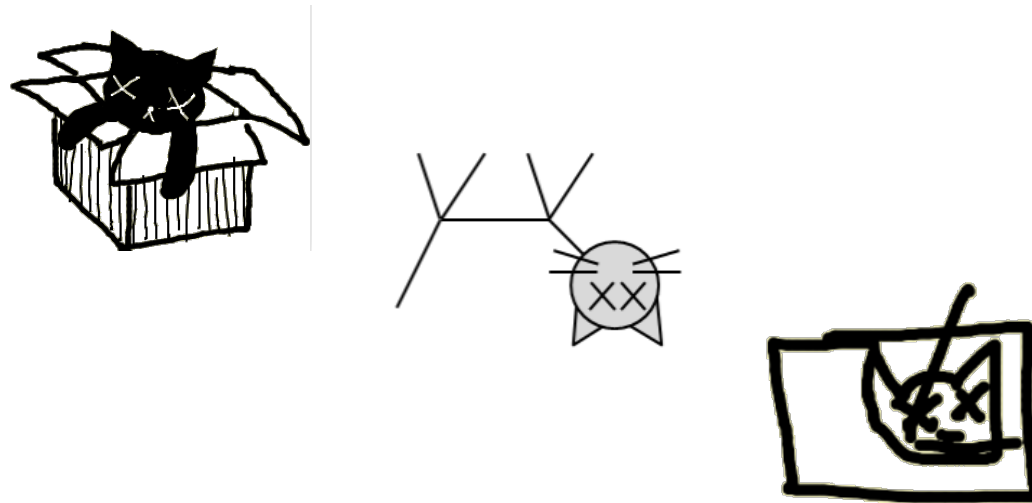# Schroedinger's Code

The good news: 58% were alive!

The rest…

"… anything less than release of actual source code is an indefensible approach for any scientific results that depend on computation…"
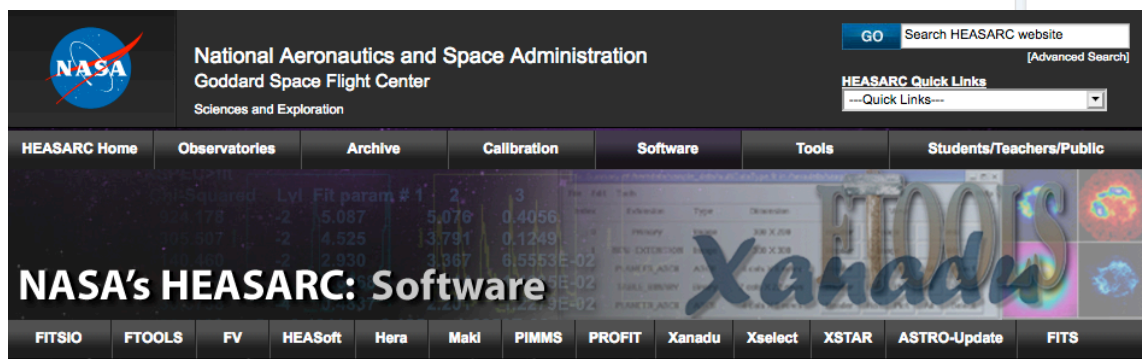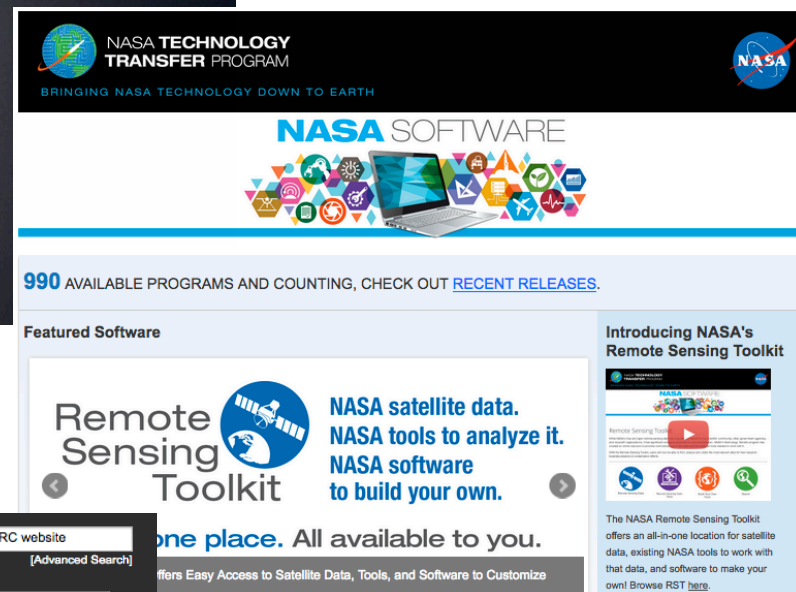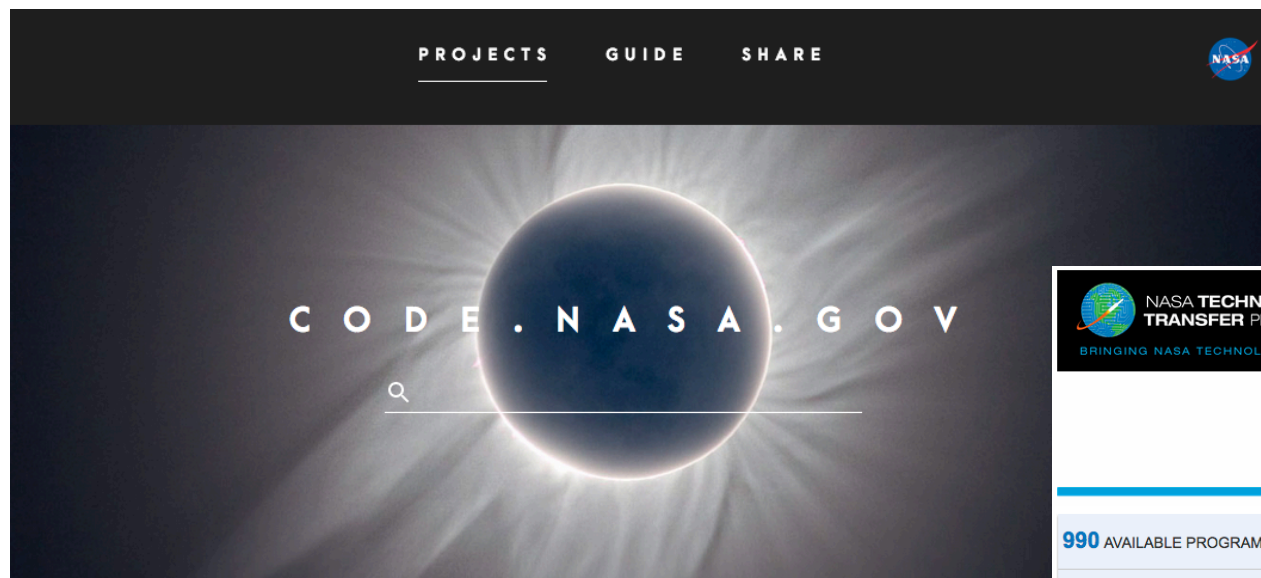
Ince, Hatton, & Graham-Cumming, *The case for open computer programs*, Nature, v. 482, Feb. 23, 2012

Code release improves research

…"a hidden coding error fueled a seven-year dispute between two of condensed matter's top theorists." Physics Today, 22 Aug 2018

…a change in a code researchers had not noticed led to incorrect results
M. Zorotovic, M. R. Schreiber and S. G. Parsons, A&A, Aug 2014

CODE.NASA.GOV

NASA TECHNOLOGY TRANSFER PROGRAM
BRINGING NASA TECHNOLOGY DOWN TO EARTH

NASA SOFTWARE

990 AVAILABLE PROGRAMS AND COUNTING, CHECK OUT RECENT RELEASES.

Featured Software

Remote Sensing Toolkit

NASA satellite data.
NASA tools to analyze it.
NASA software
to build your own.

...one place. All available to you.

...offers Easy Access to Satellite Data, Tools, and Software to Customize

Introducing NASA's
Remote Sensing Toolkit

The NASA Remote Sensing Toolkit offers an all-in-one location for satellite data, existing NASA tools to work with that data, and software to make your own! Browse RST here.

National Aeronautics and Space Administration
Goddard Space Flight Center
Sciences and Exploration

GO | Search HEASARC website
[Advanced Search]
HEASARC Quick Links
----Quick Links----

| HEASARC Home | Observatories | Archive | Calibration | Software | Tools | Students/Teachers/Public |

NASA's HEASARC: Software

| FITSIO | FTOOLS | FV | HEASoft | Hera | Maki | PIMMS | PROFIT | Xanadu | Xselect | XSTAR | ASTRO-Update | FITS |

HEASoft
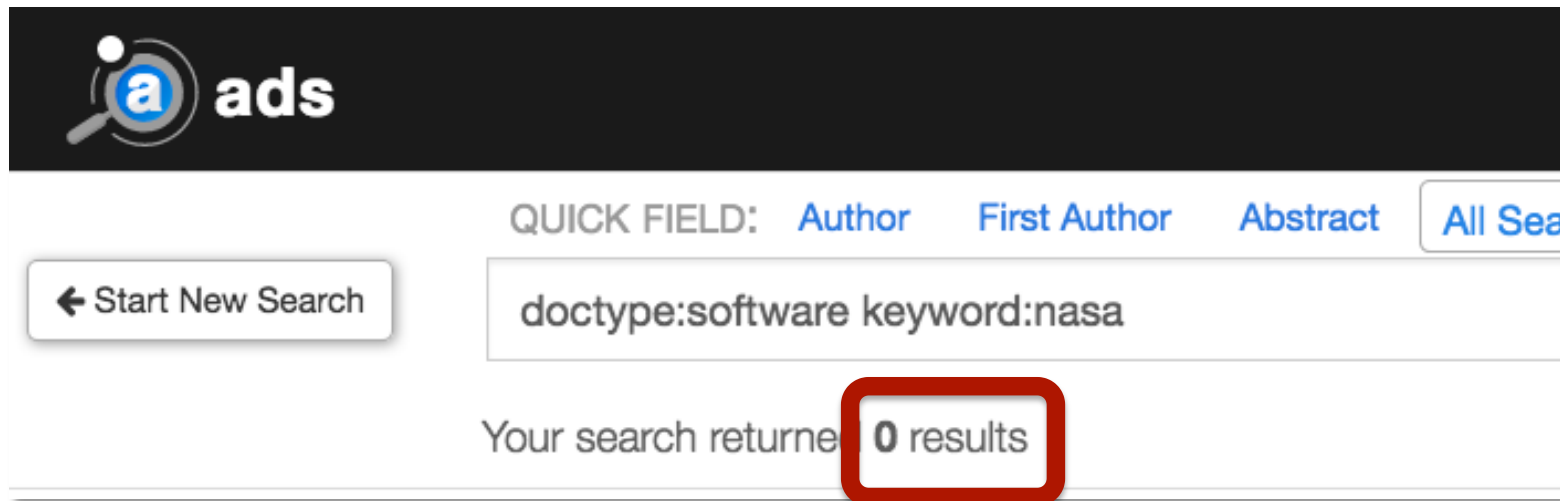
A Unified Release of the FTOOLS and XANADU Software Packages

The current version of HEAsoft is **6.25**
(23 October 2018)

XANADU High-level, multi-mission tasks for X-ray astronomical spectral, timing, and imaging data analysis
FTOOLS General and mission-specific tools to manipulate FITS files
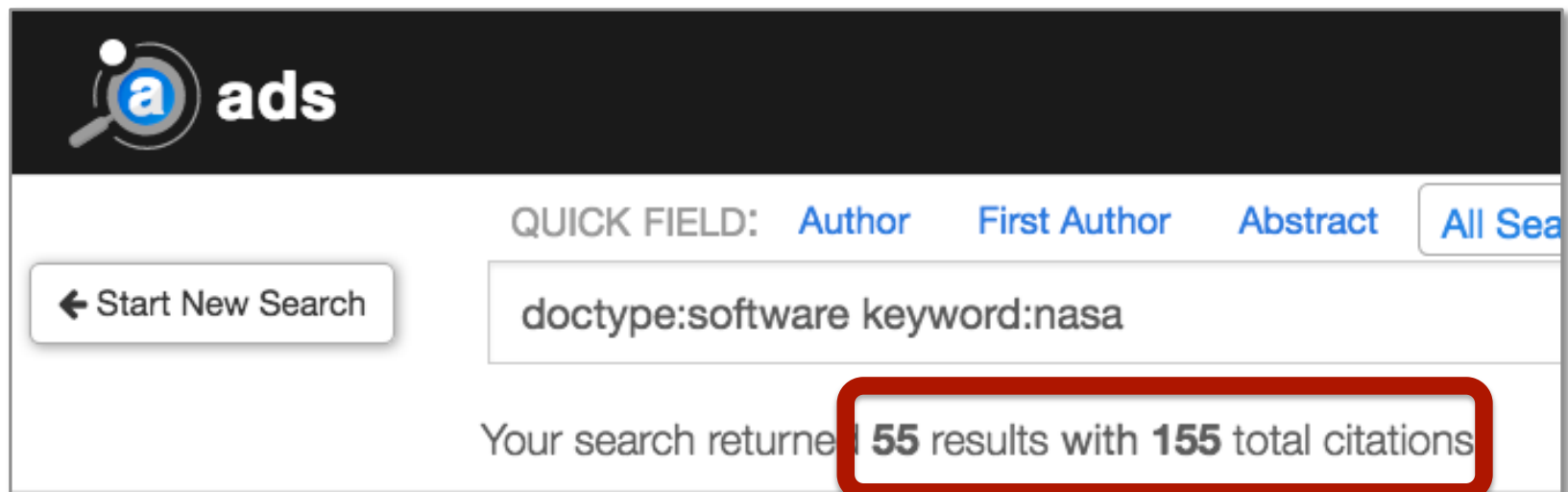FITSIO Core library responsible for reading and writing FITS files (distributed with FTOOLS)

Changing this… 🙁

Your search returned **0 results**

…to this! 🥰

Your search returned **55** results with **155** total citations

What is the ASCL?

Registry of codes used in research

Can serve as a repository

Indexed by ADS, Web of Science, and
  other indexers

ascl.net

ASCL registers codes used in

- refereed articles
- articles submitted for refereeing
- accepted PhD theses

AND which has

- **source** code available for download
  without barriers

Live dangerously;
do a live demo

Registering your software gets you …

… a unique identifier

… entries about your software in ADS (Web of Science, Google Scholar…)

… a trackable citation method

… increased discoverability

Submit your code!
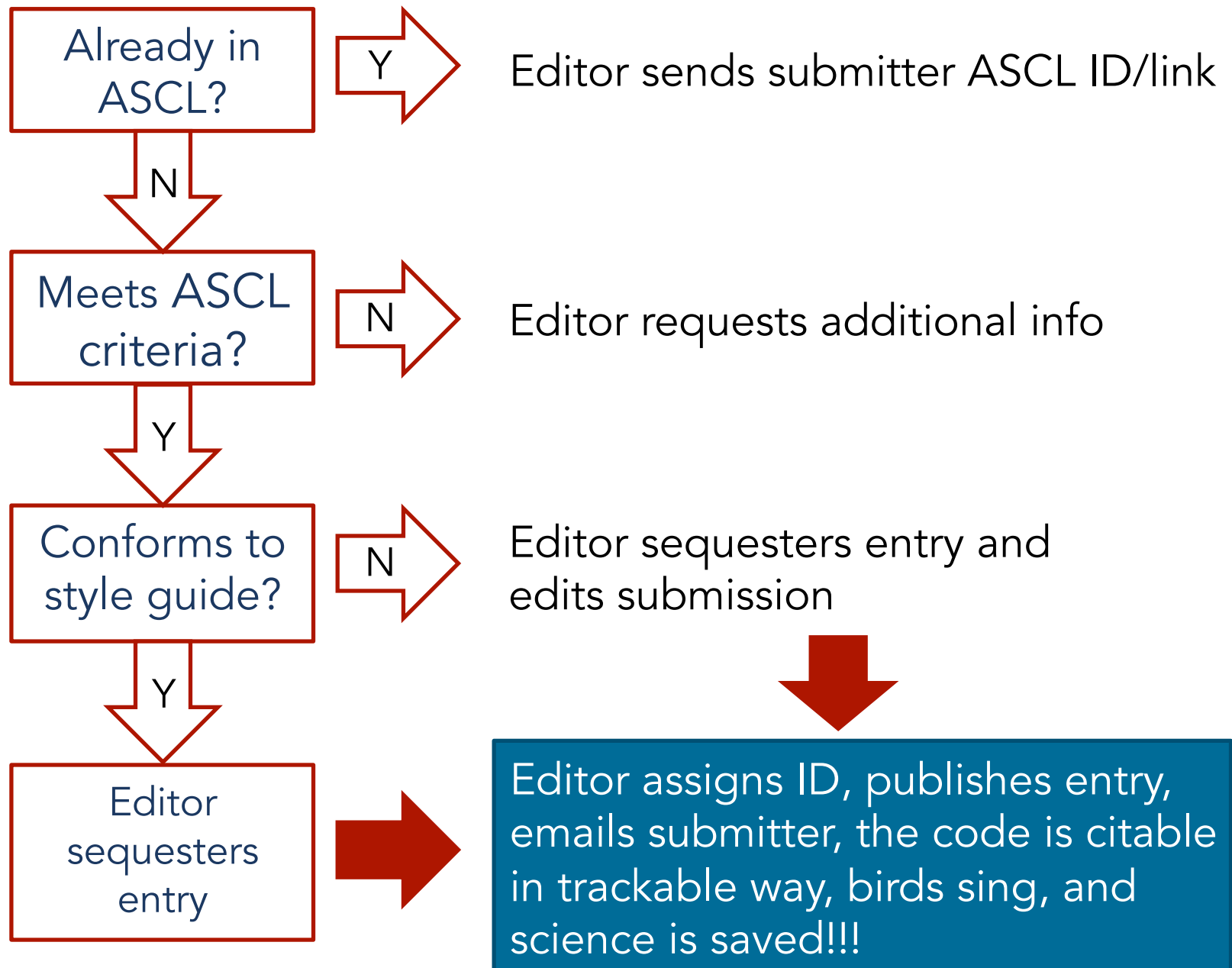
Use handy online form

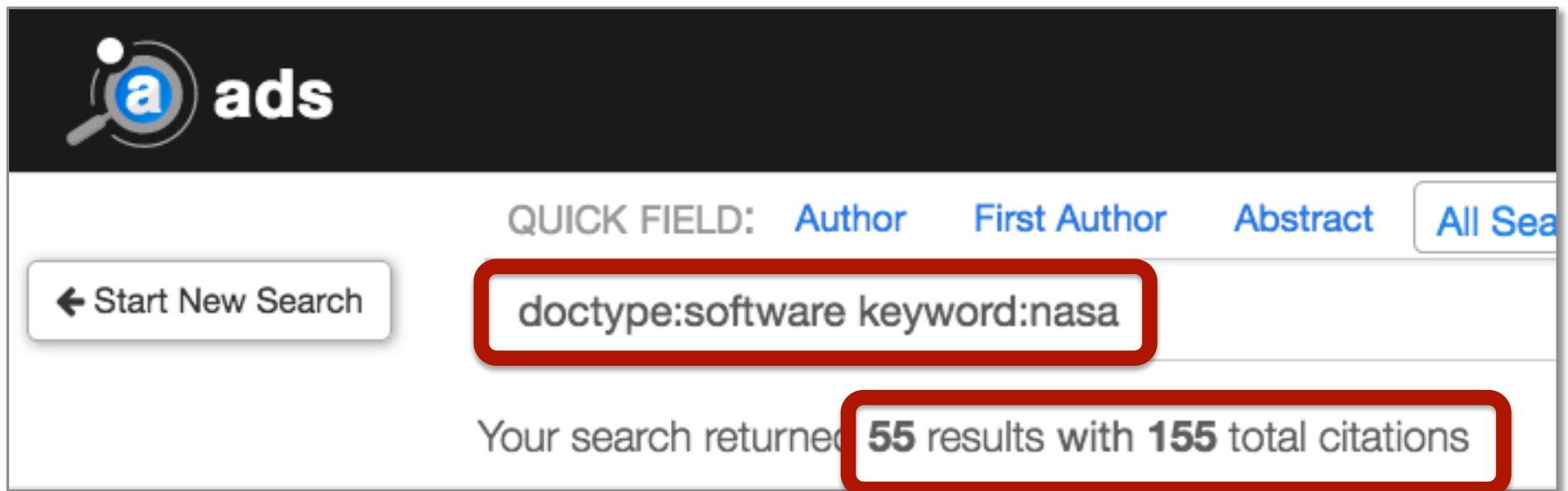Email info to editor@ascl.net

Submit via CodeMeta.JSON file

```
Already in
ASCL?          ──Y──►   Editor sends submitter ASCL ID/link

   │
   N
   ▼

Meets ASCL
criteria?       ──N──►   Editor requests additional info

   │
   Y
   ▼

Conforms to
style guide?    ──N──►   Editor sequesters entry and
                         edits submission
   │                                      │
   Y                                      ▼
   ▼
                         ┌──────────────────────────────────────┐
Editor                   │ Editor assigns ID, publishes entry,  │
sequesters      ──────►  │ emails submitter, the code is citable │
entry                    │ in trackable way, birds sing, and     │
                         │ science is saved!!!                   │
                         └──────────────────────────────────────┘
```

Indexing

ADS: weekly

Web of Science: quarterly

Google: almost as it happens

Google Scholar: no idea

ADS search results

Code entry

Keyword search page

On ADS

open source project and contributions of new tasks or enhanc
existing tasks by the community are welcome.

Publication: Astrophysics Source Code Library, record ascl

Pub Date: August 2012

Bibcode: 2012ascl.soft08004S ❓

Keywords: Software; NASA

GREATER RECOGNITION

By registering your code…

… your code is discoverable!

… ADS links your code to research it enabled, and research to your code

… your code is citable!

… ADS tracks citations to your code from literature it indexes

ASCL citation format

Barnes, J. E., 2011, Astrophysics Source
Code Library, record ascl:1102.027

OR

Barnes, J. E., 2011, ZENO, Astrophysics
Source Code Library, record ascl:1102.027

Citation methods

Software itself via ASCL, JOSS, DOI from
   archiving service

Article using or describing the code

~~GitHub, SourceForge, BitBucket repo URL~~ *NO!*

~~URL to personal institutional page~~ *NO!*

~~URLs in general~~ *NO!*

New journals

2012 – JORS
Journal of Open Research Software

2013 - A&C
Astronomy and Computing

2014 – ComAC
Computational Astrophysics and Cosmology

2015 - SoftX
Software X

2016 – JOSS
Journal of Open Source Software

2017 – RNAAS
Research Notes of the AAS

Changes in existing journals

Encourage or require software citations

Allow software articles without research results

Encourage or require code release

Community resources

More places to put software and
   information about software

Indexers capture/track software citations

Broader efforts cross disciplines and
   influence others

Using ADS to find software

Doctype field value "software"

Can be combined with other fields, such as keyword

Secrets of the ASCL!

Random code link on Browse page

Author name links can pull up other codes

"Short name" can be used to pull up an entry

Can download all ASCL public data

RSS feed for news items

List o' articles and posts about software

You can change the world!*

Release your software

Specify how you want your software cited
   Make this info easy to find!

Assign a license

Register your code

Archive your code

Cite other people's codes well

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* At least a small part of it, which is still cool!