Data mining:
Making the most of the ALMA archive

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The ALMA archive in a nutshell

What can I do with the ALMA archive ?

- See the list of all observed ALMA projects, i.e., previous and current cycles
- Download publicly available datasets (i.e., delivered more than a year ago)

Why should I use the ALMA archive ?

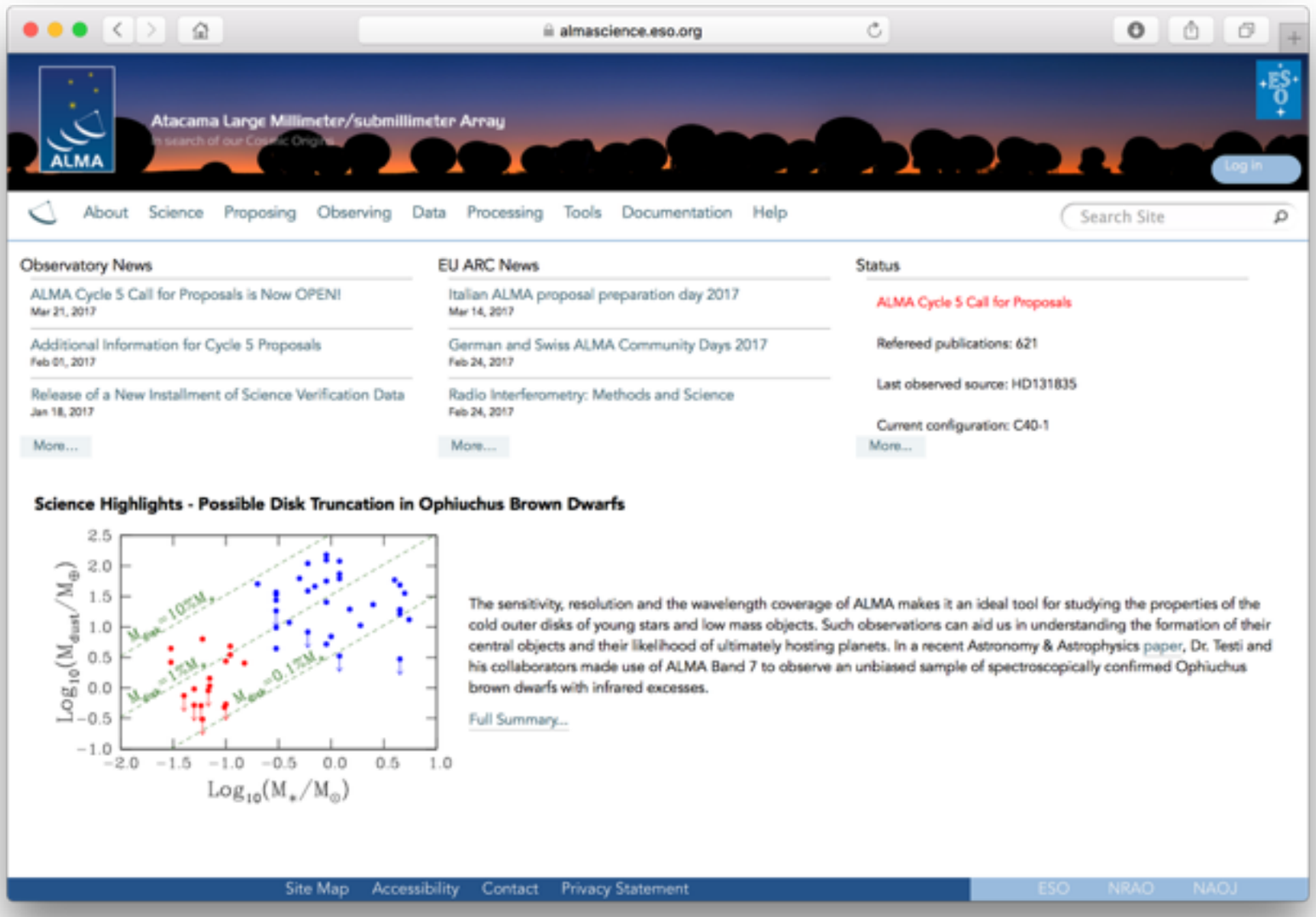
- To verify possible duplication issues before submitting your proposal
- To retrieve your proprietary ALMA observations
- To make the most of the ALMA observations not yet exploited by their PI

How can I access the ALMA archive ?

- via its web interface on the ALMA science portal (**WWW.ALMASCIENCE.ESO.ORG**)
- via the python package **ASTROQUERY**

Exploring the ALMA archive

Everything start, of course, from the ALMA science portal !



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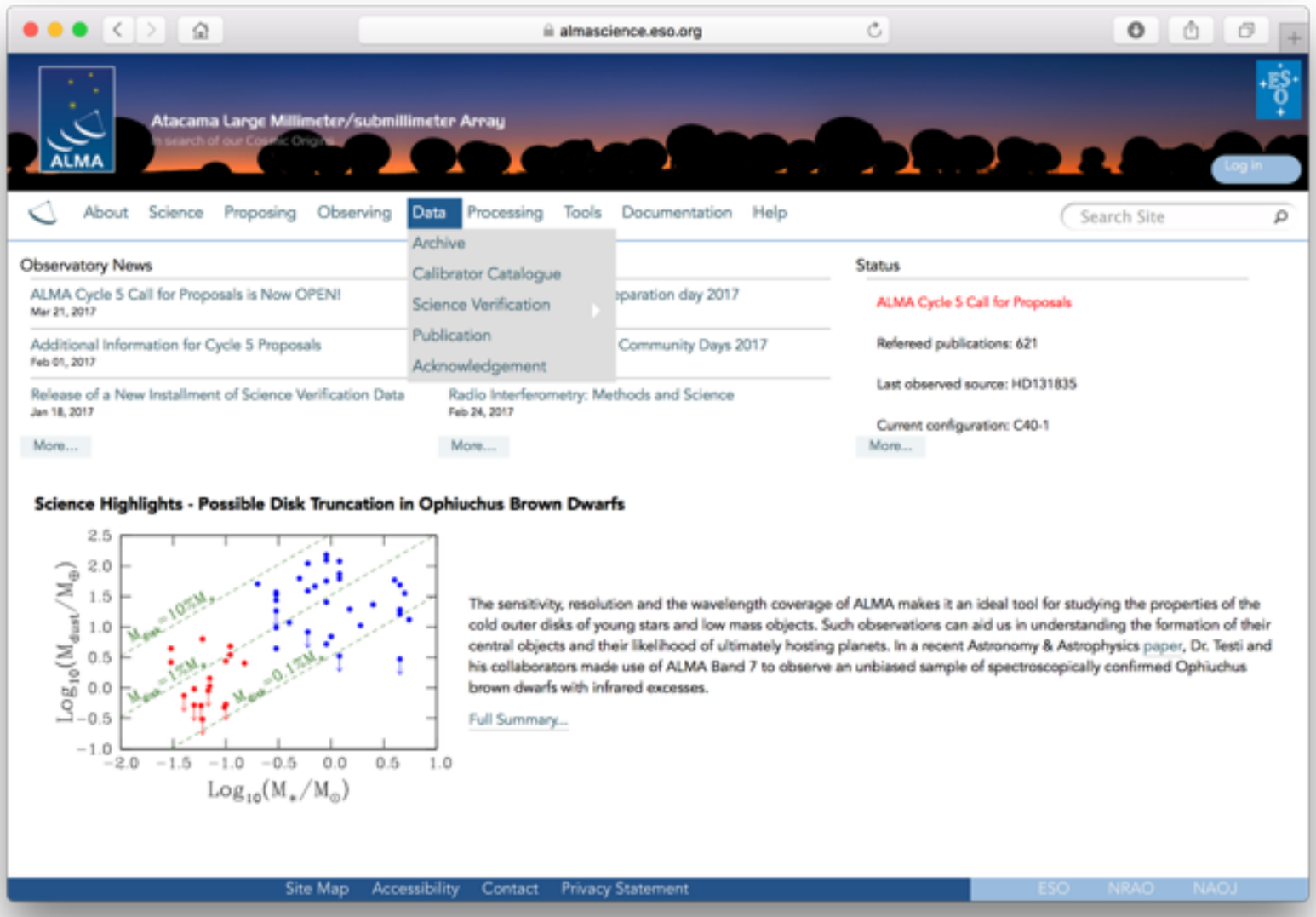

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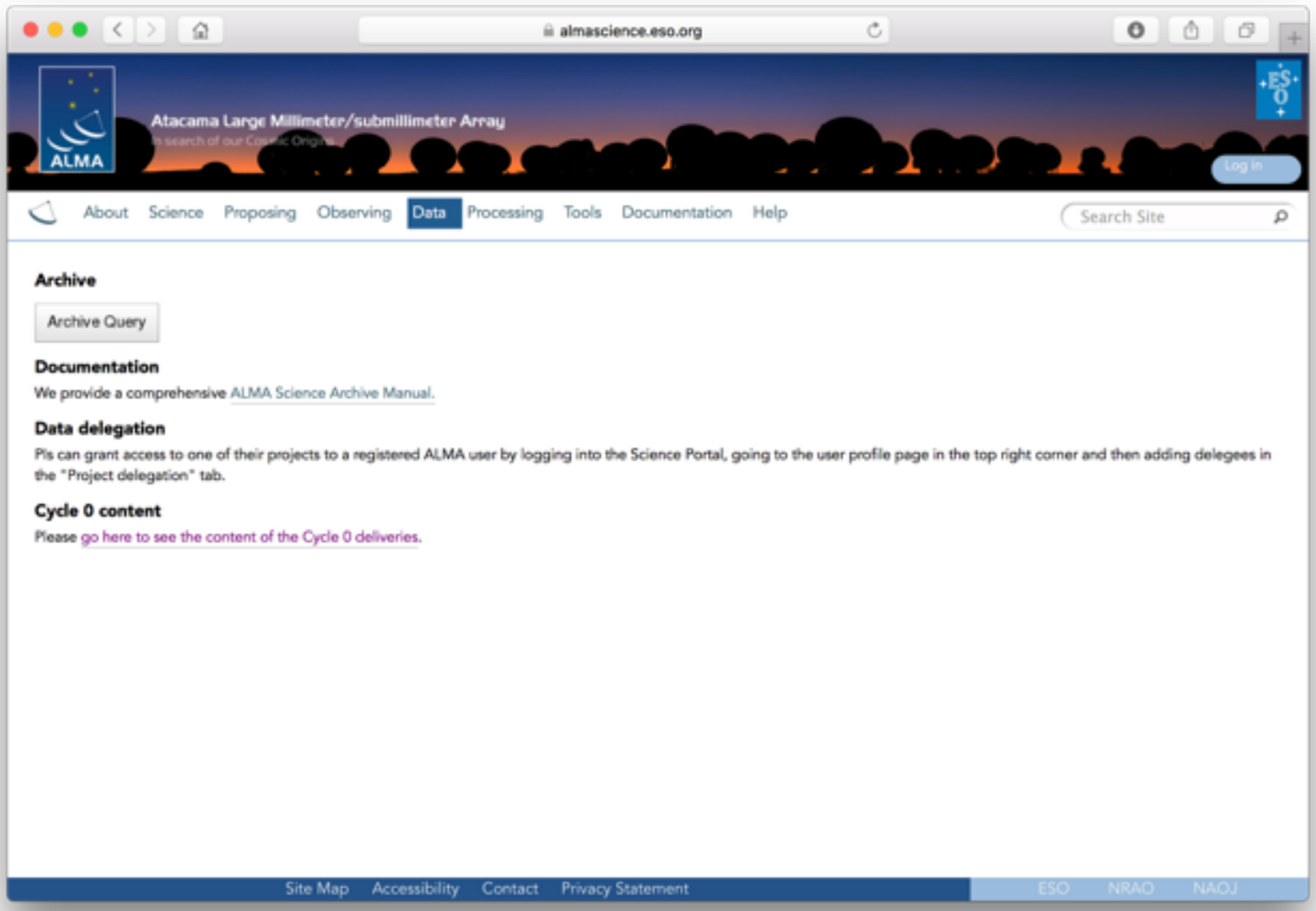

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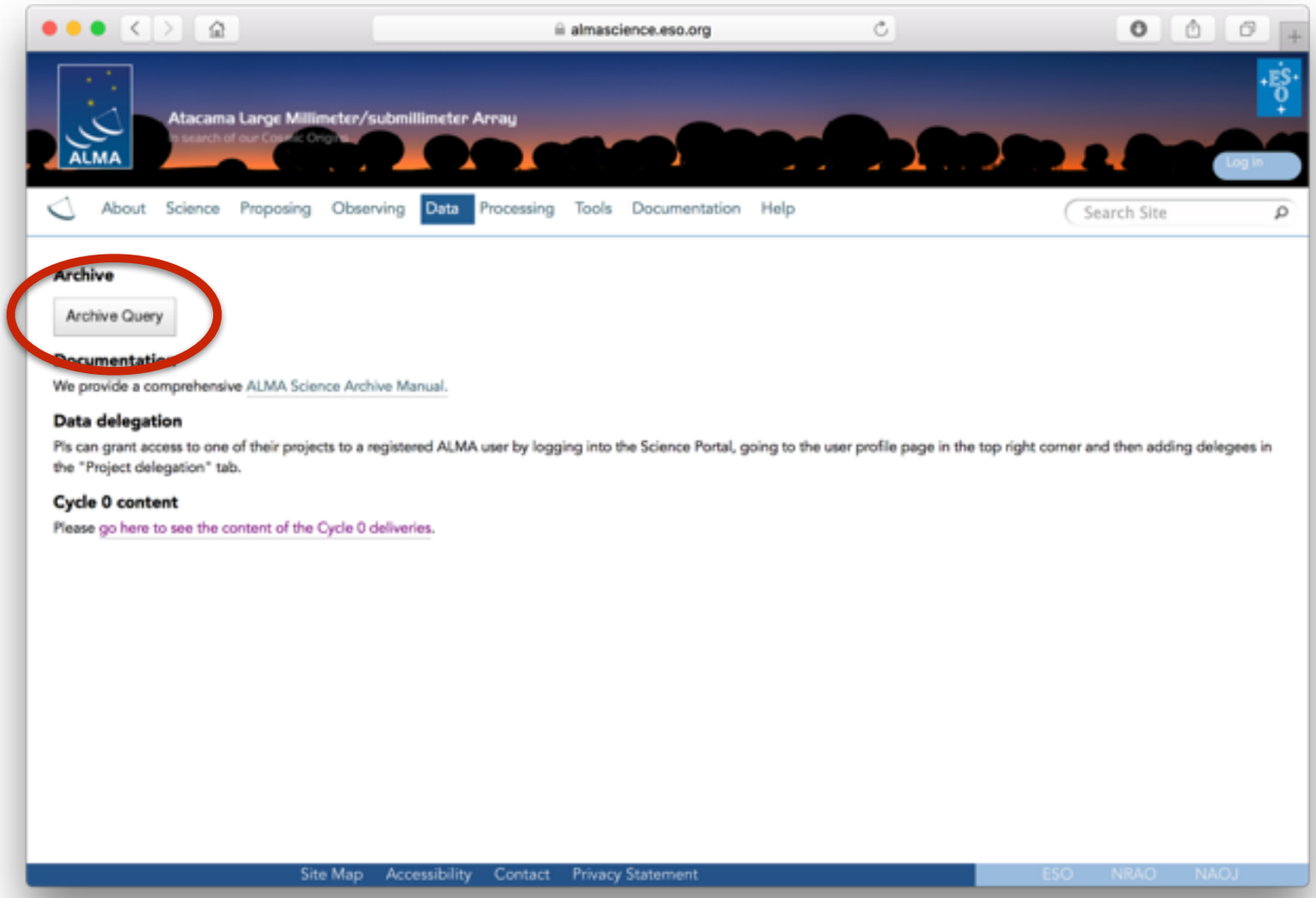

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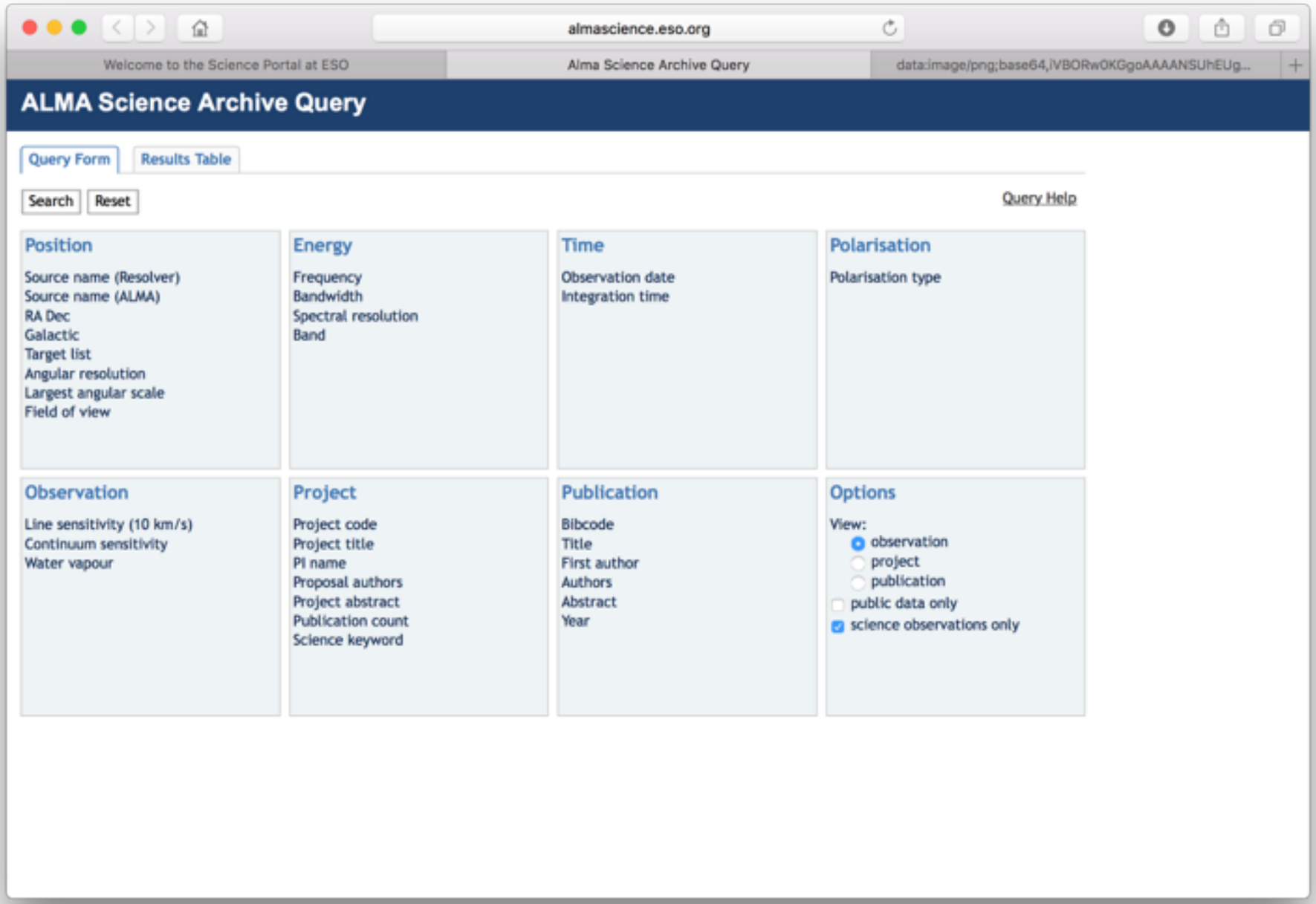
Queries can be performed in many different ways and can be combined.



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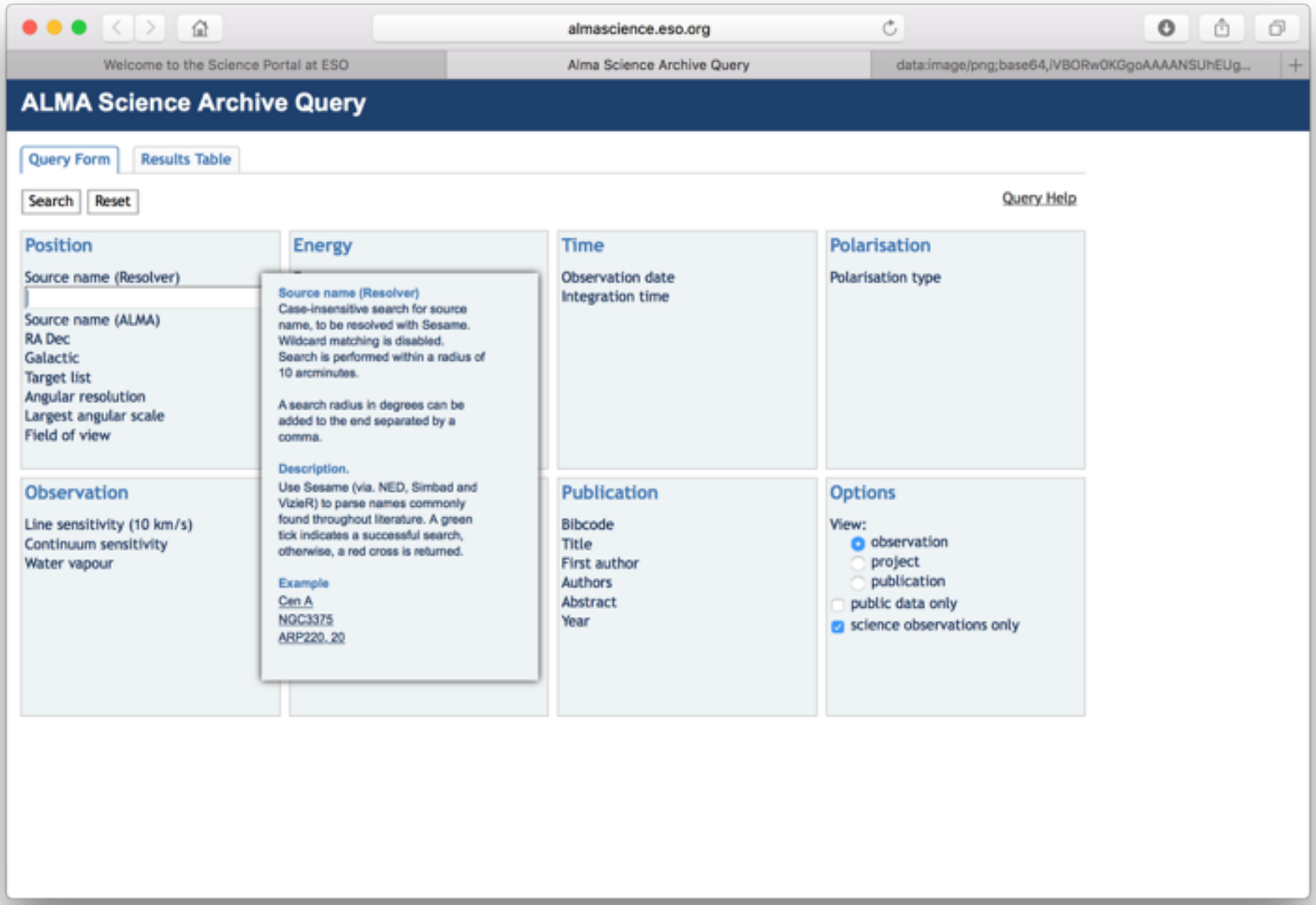
To start just hover over the appropriate search box
(Tips and examples will also appear)



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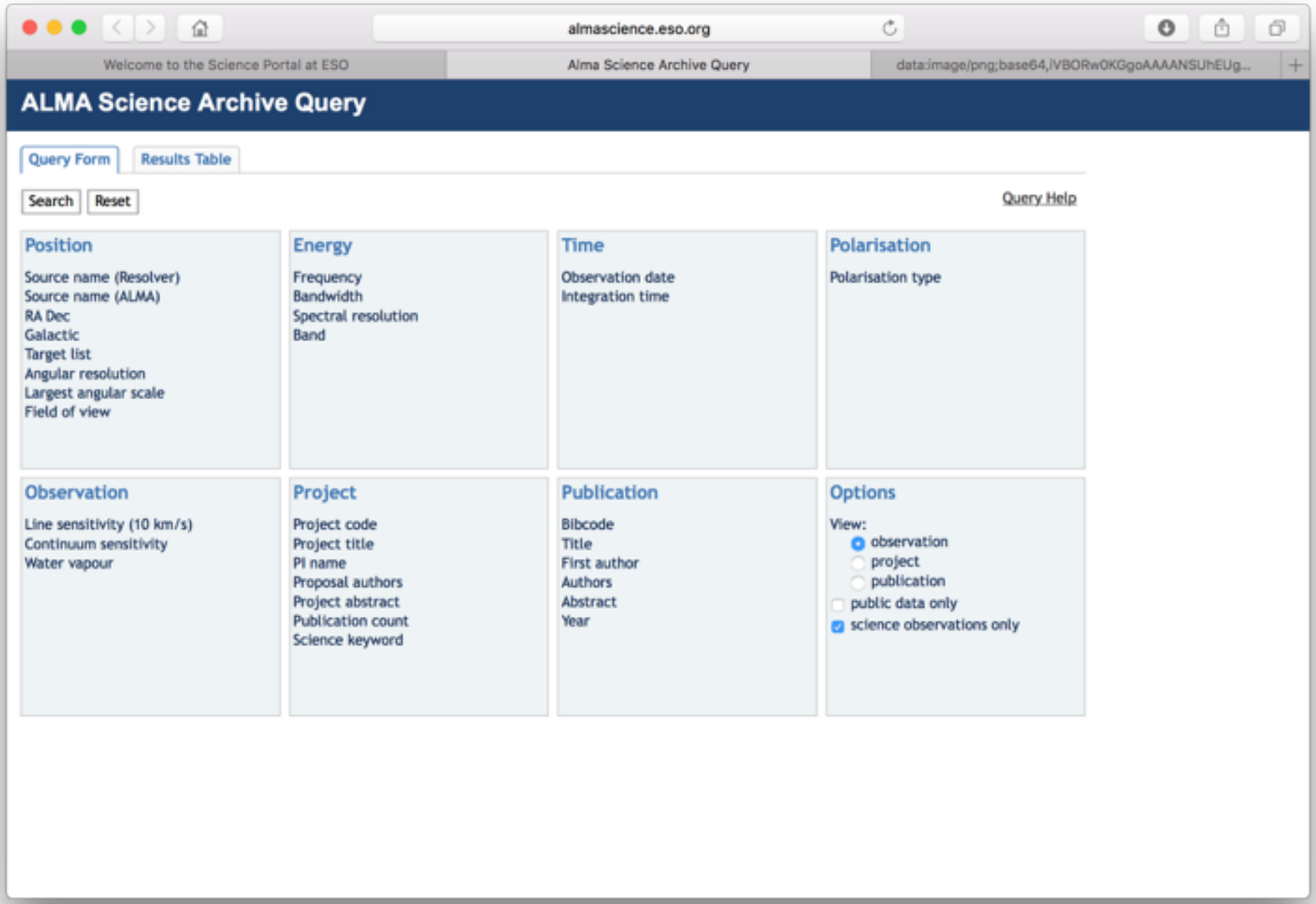

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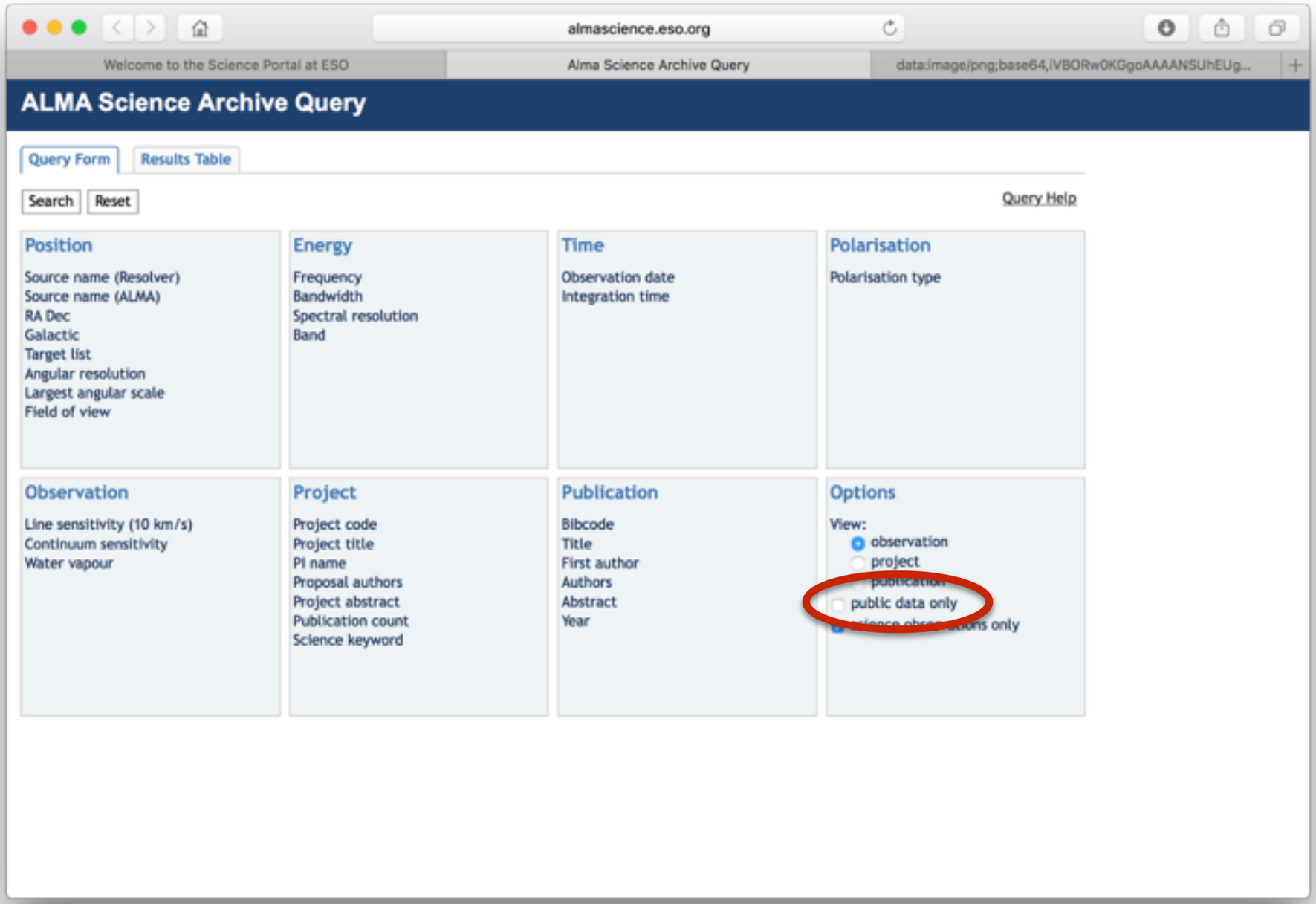

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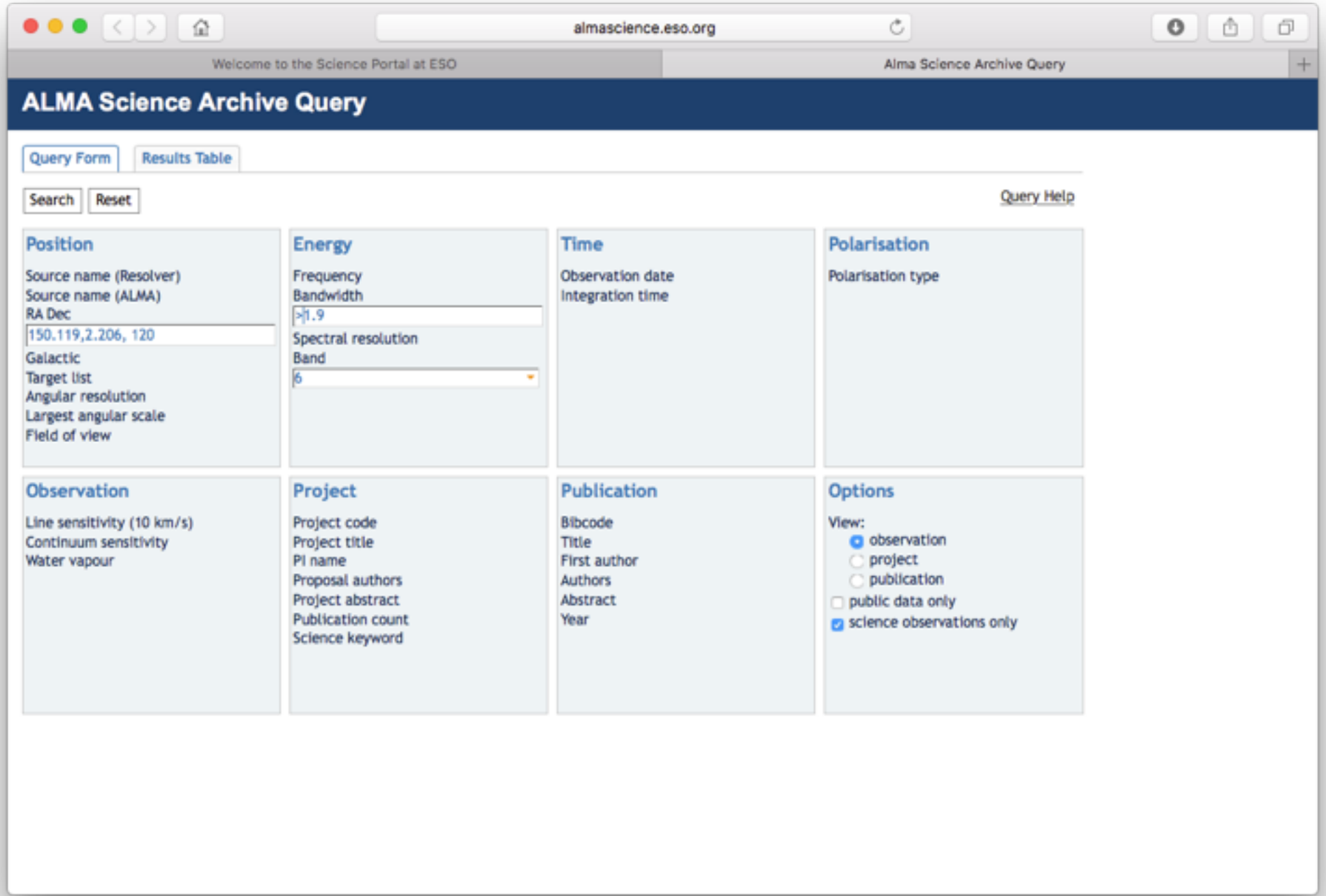

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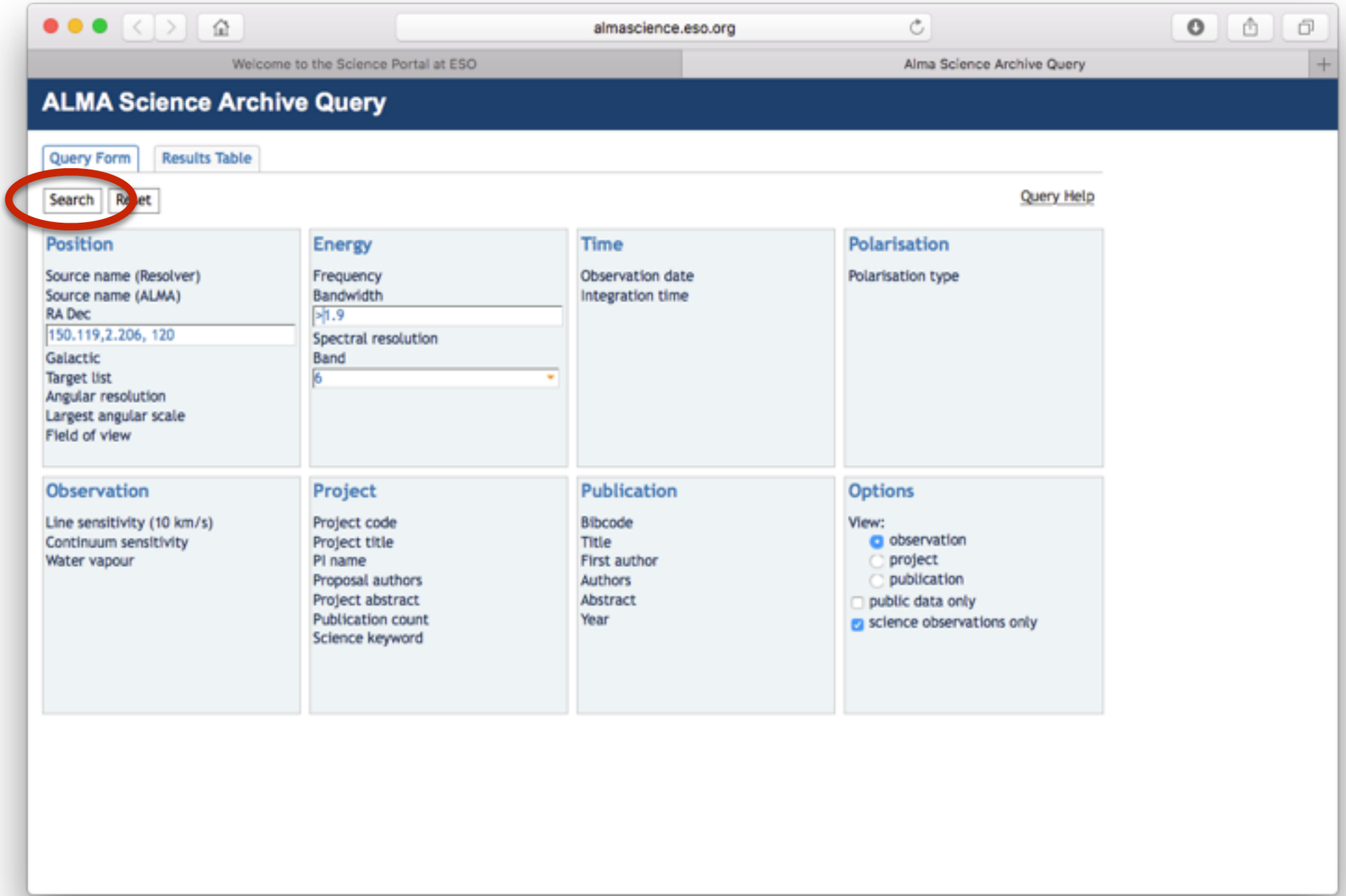

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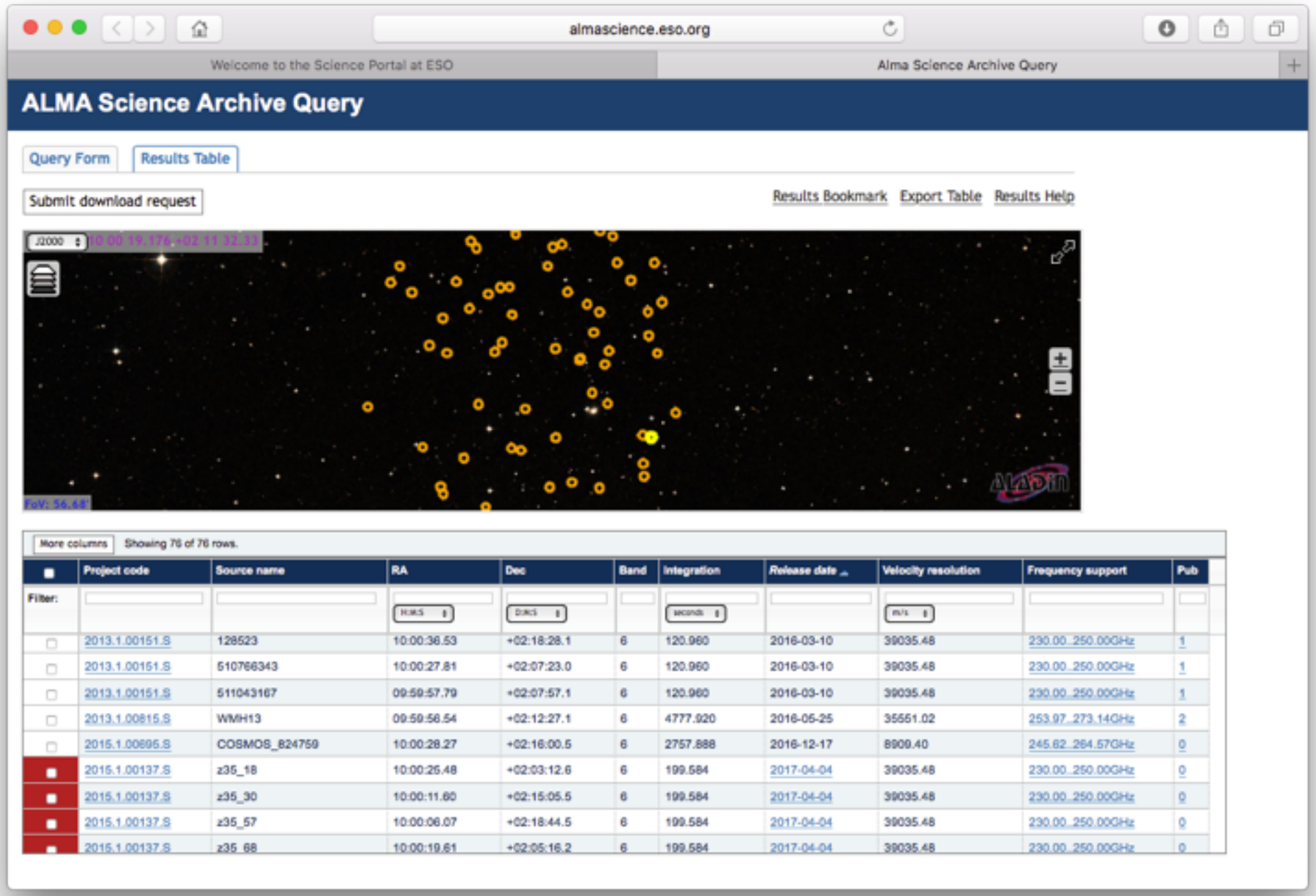

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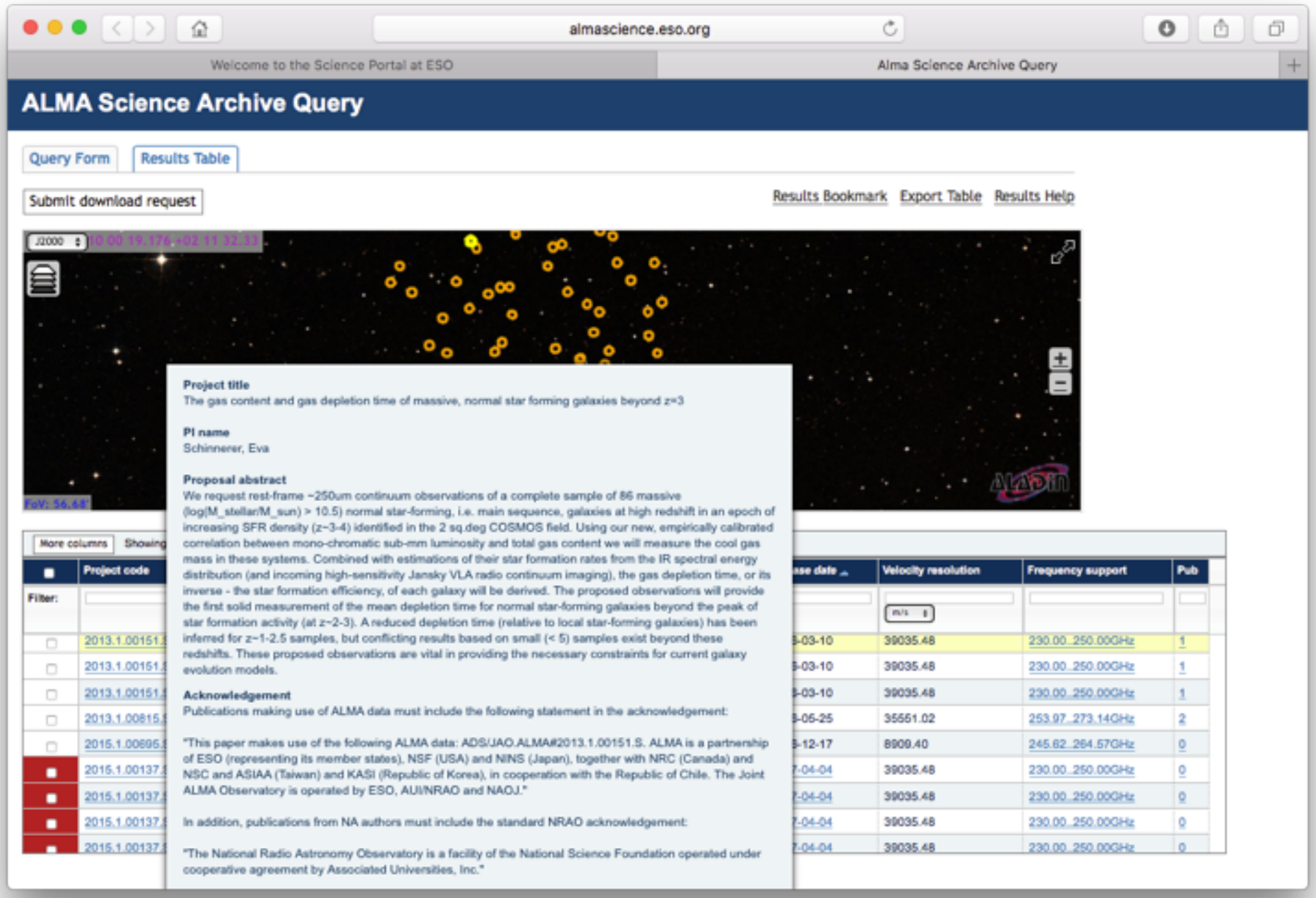

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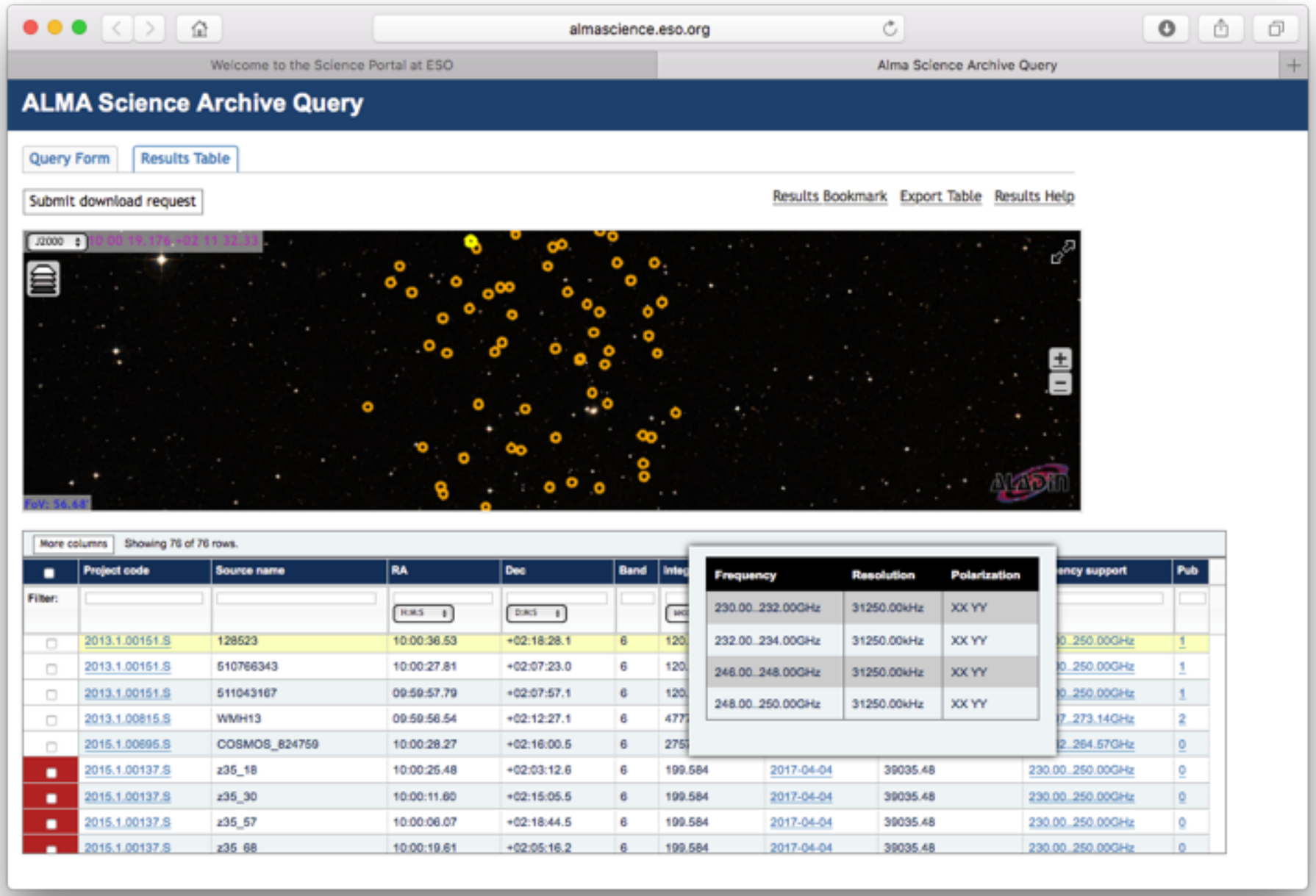

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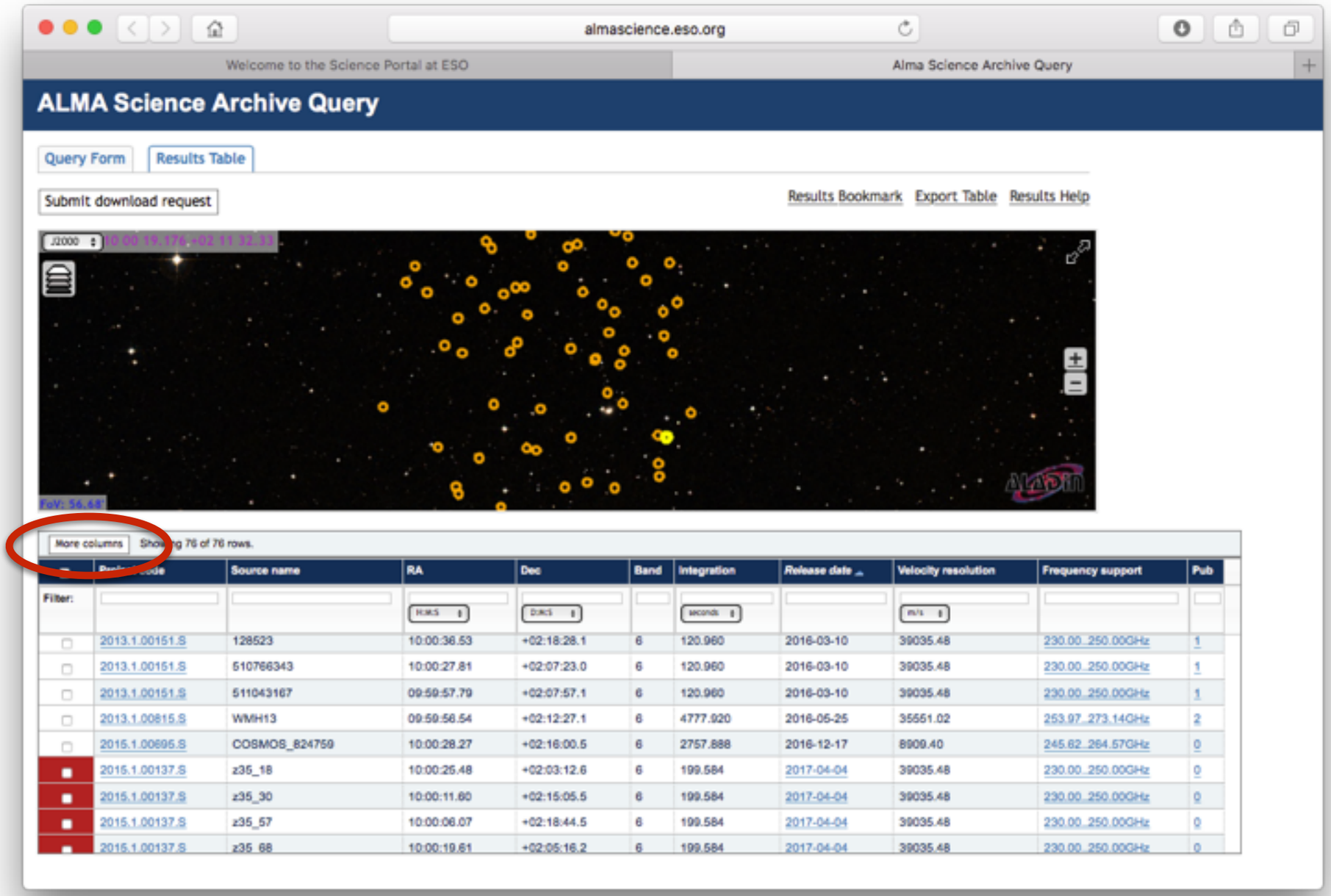

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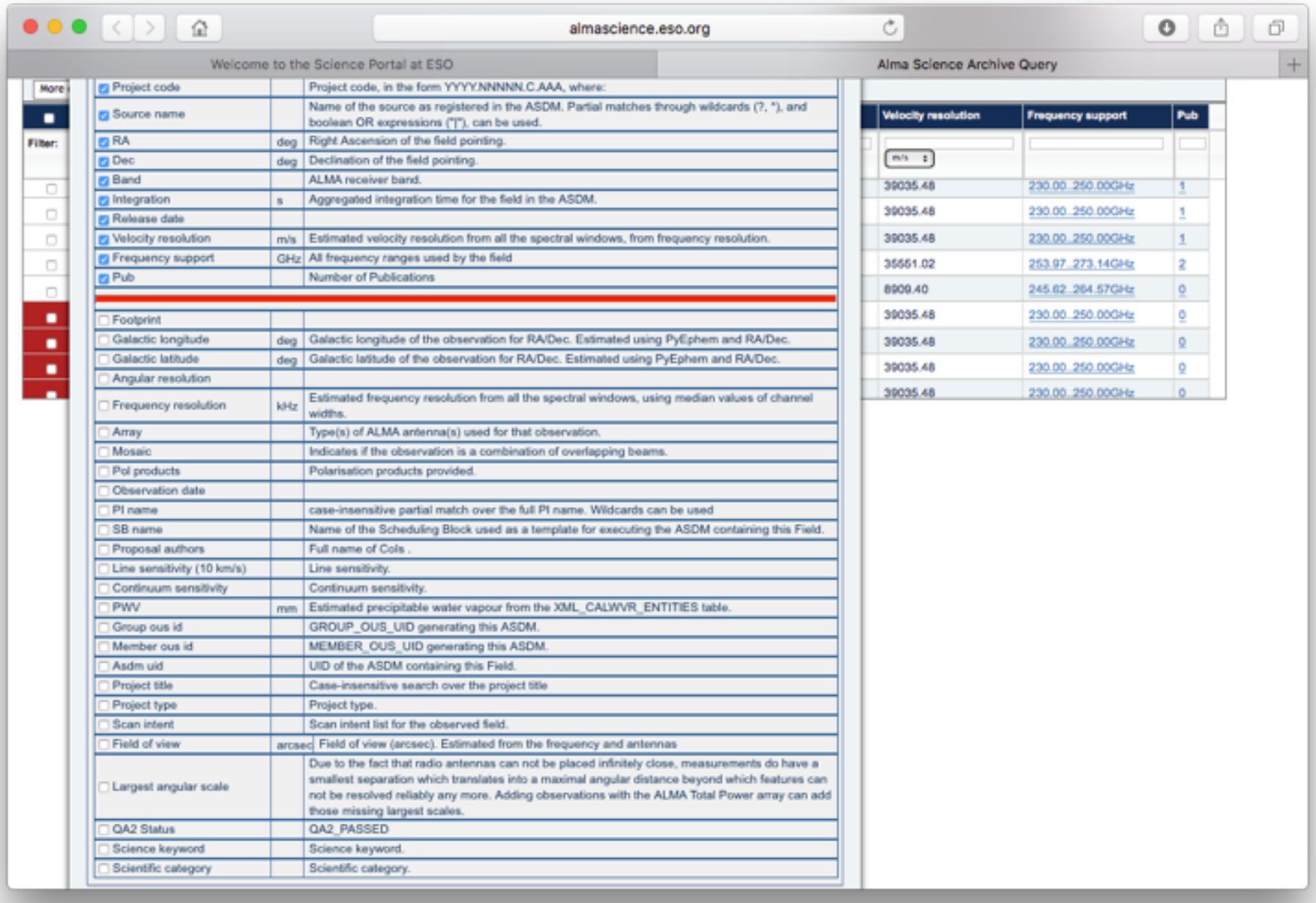

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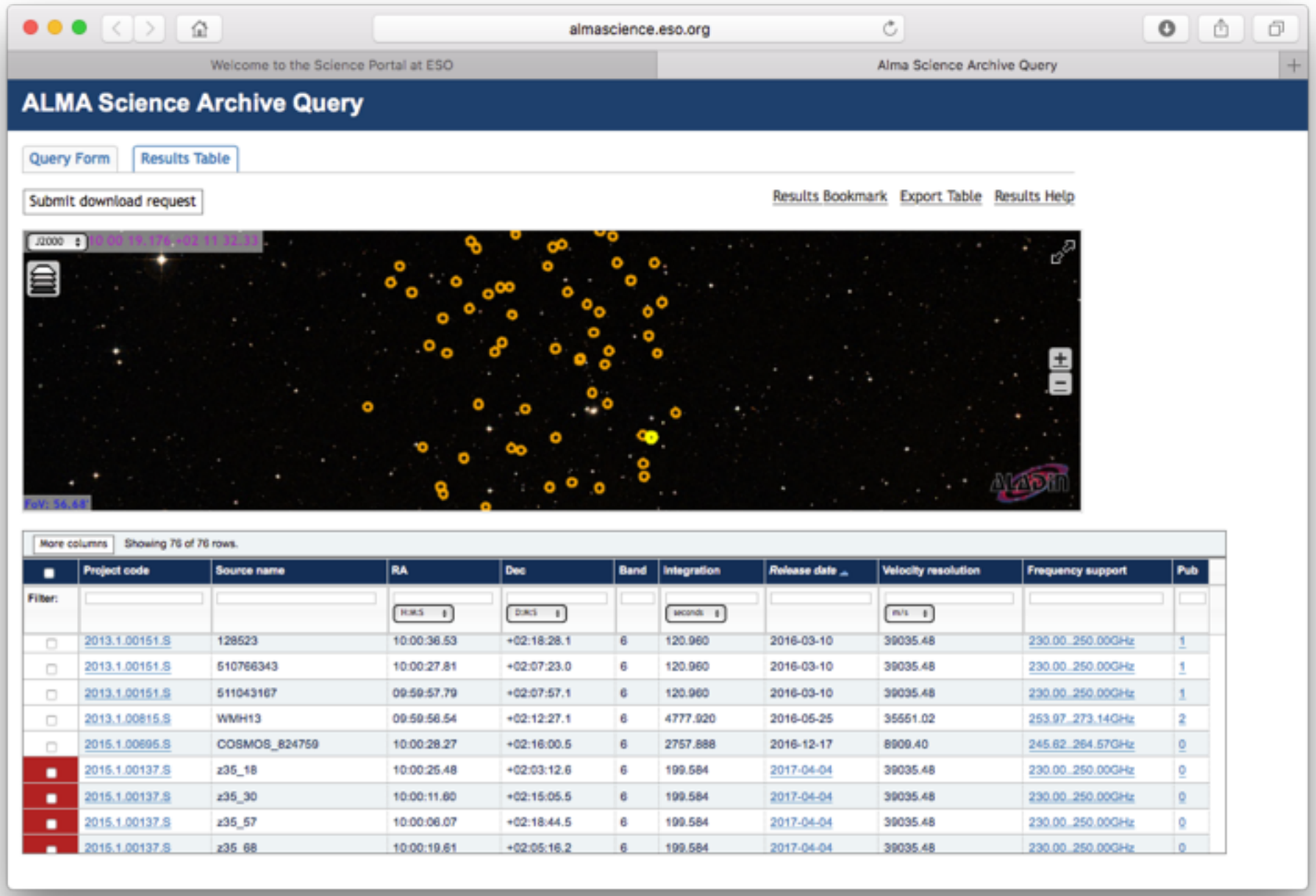

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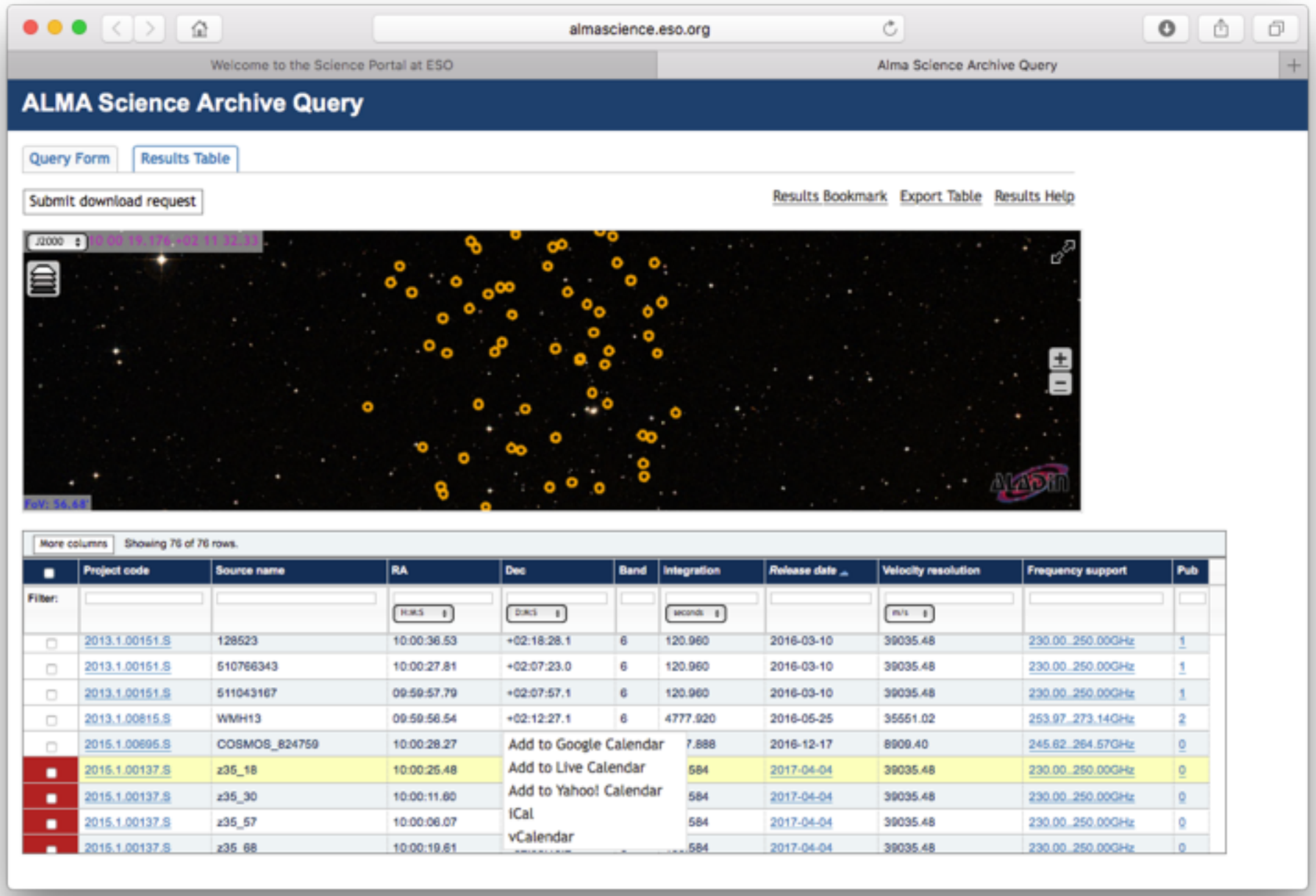

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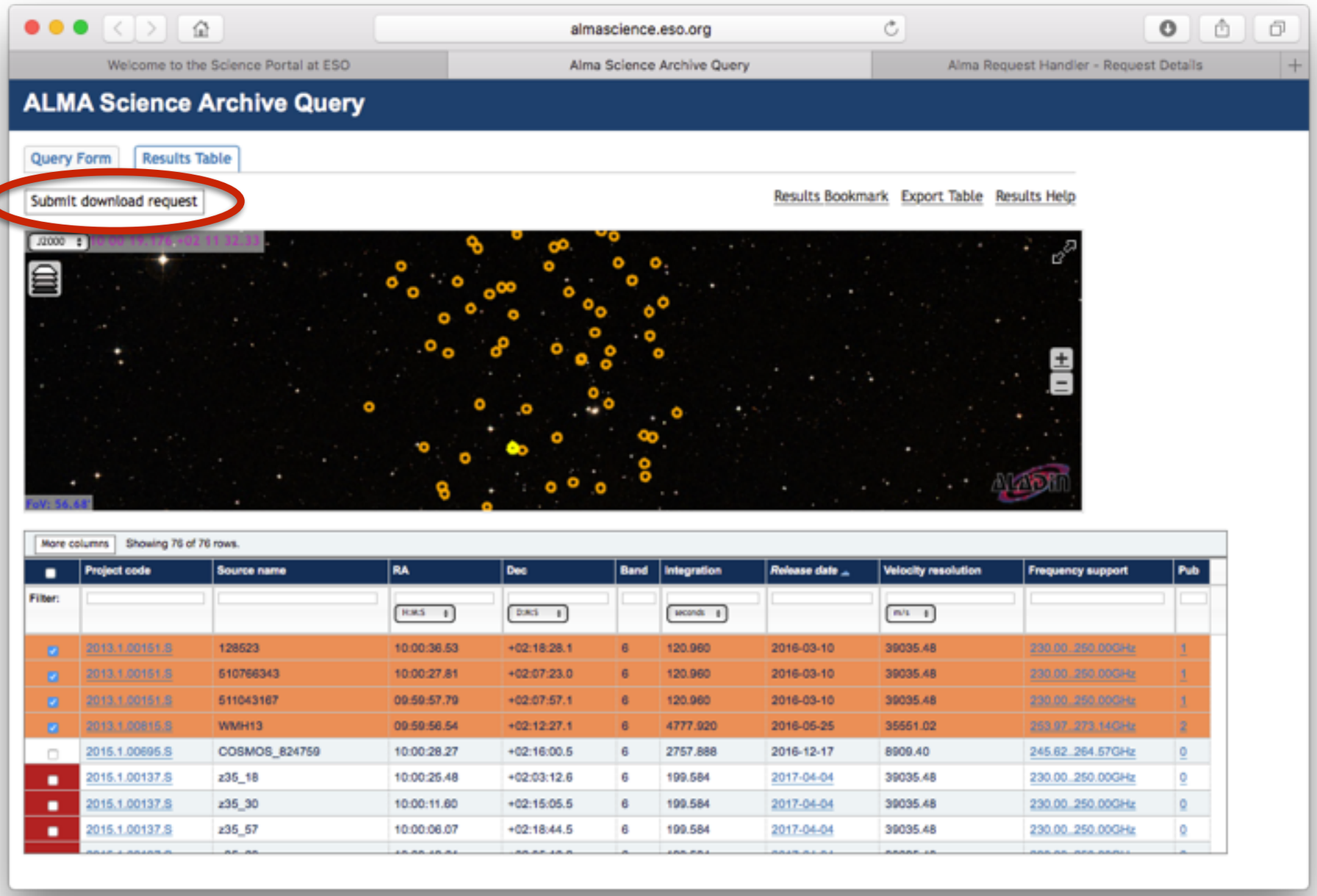

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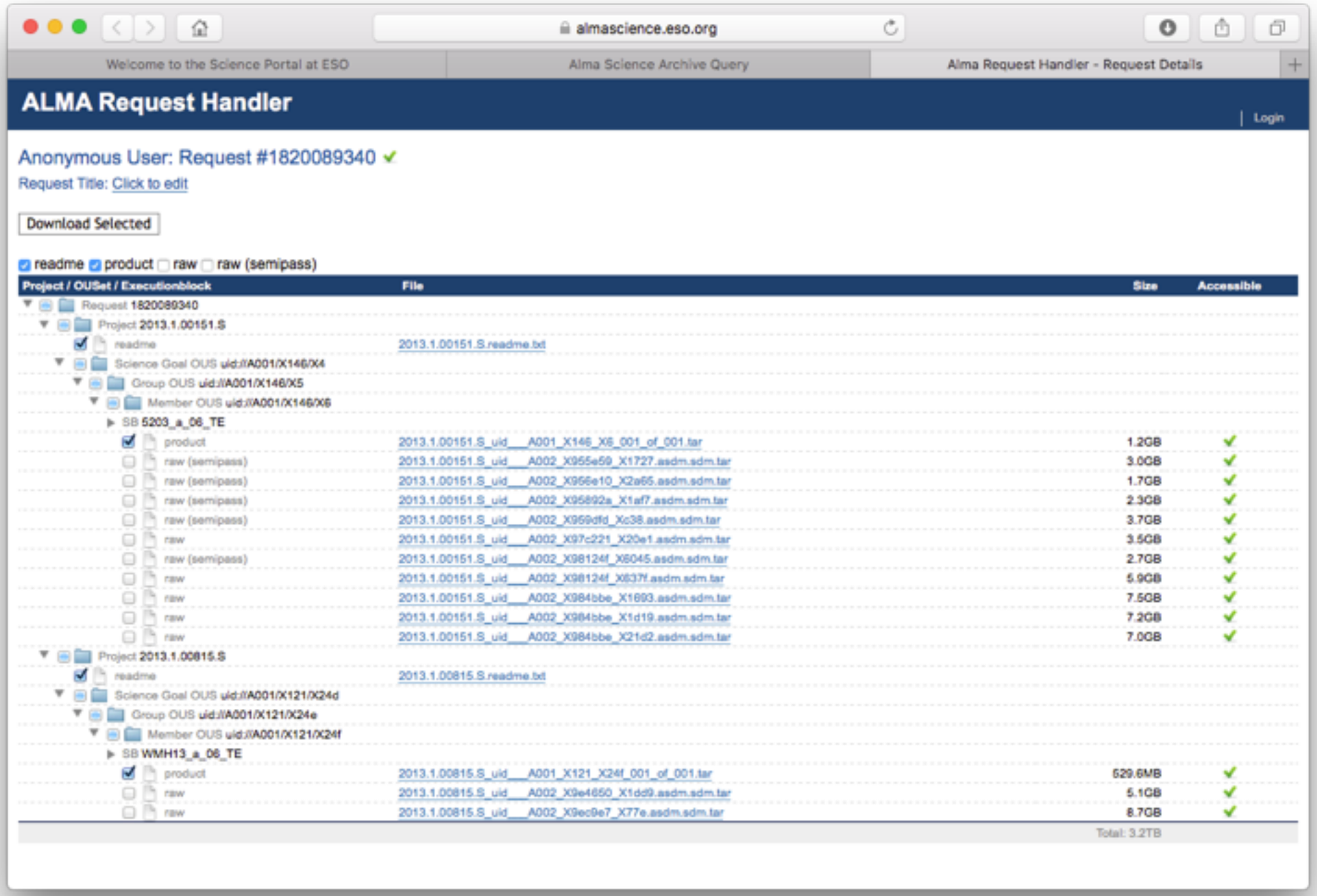
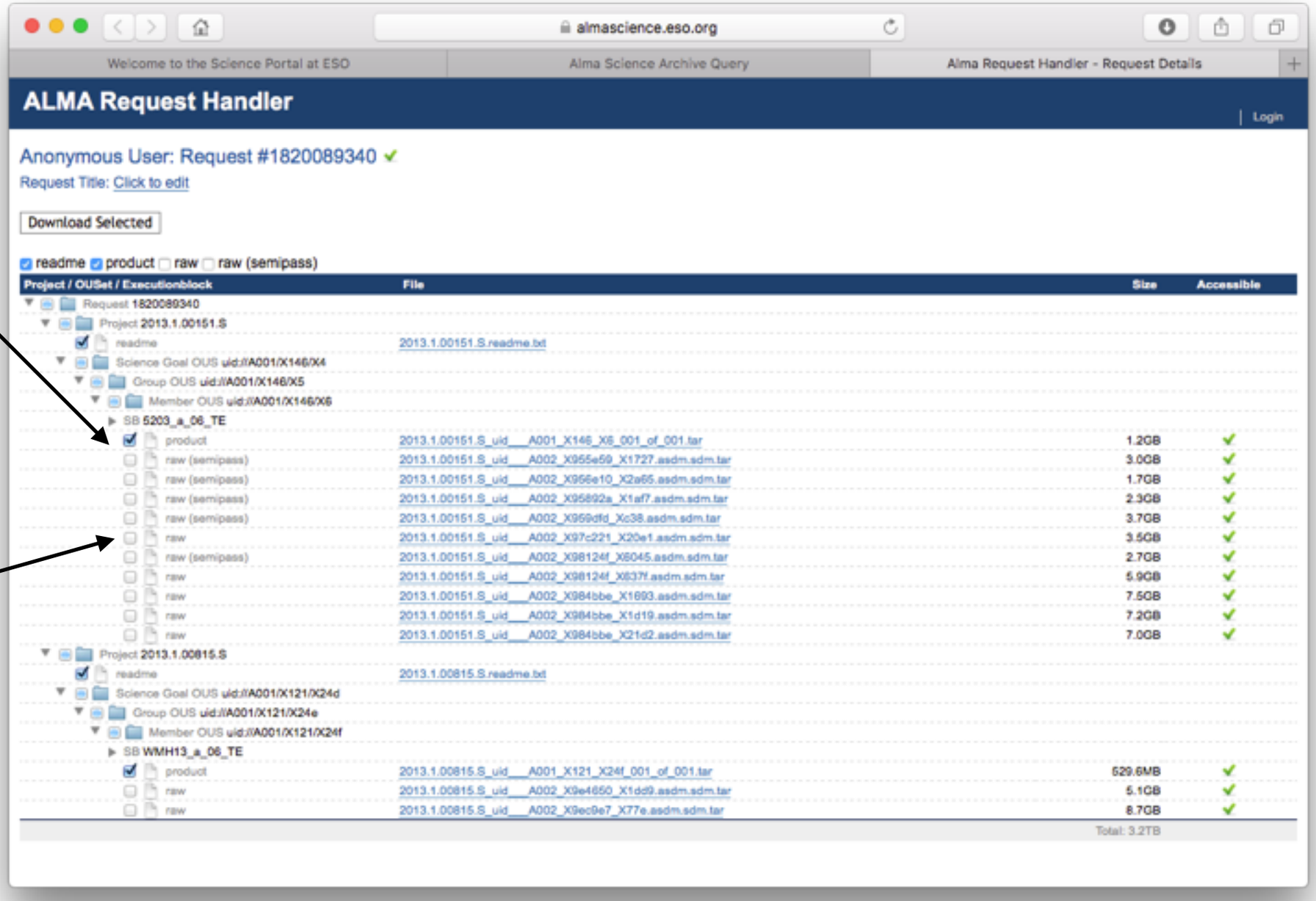


Exploring the ALMA archive

“Product” contains the scripts, images and cubes produced by the QA2 analyst

“Raw” contain the raw data, it is needed if you want to re-calibrate and/or re-image



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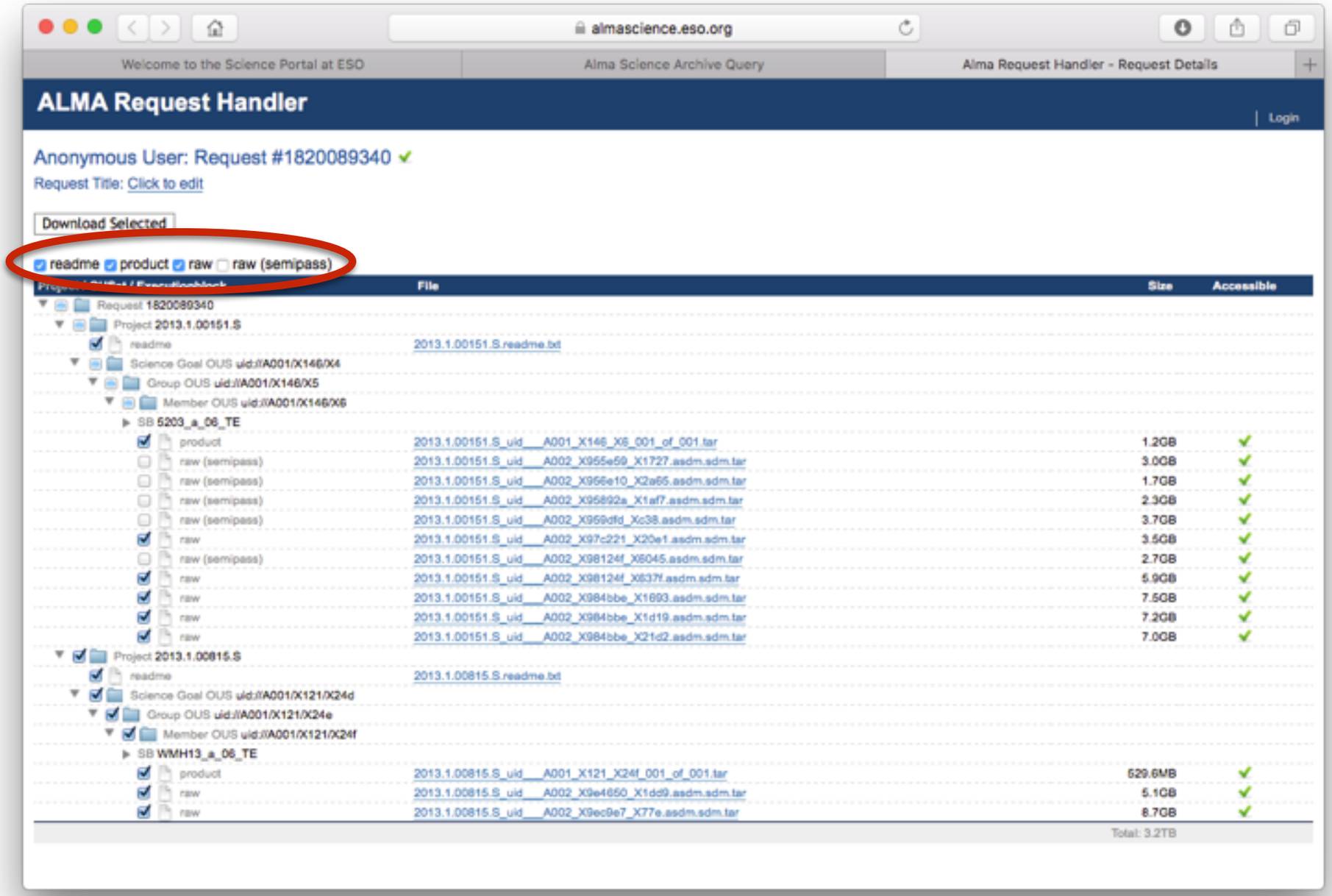

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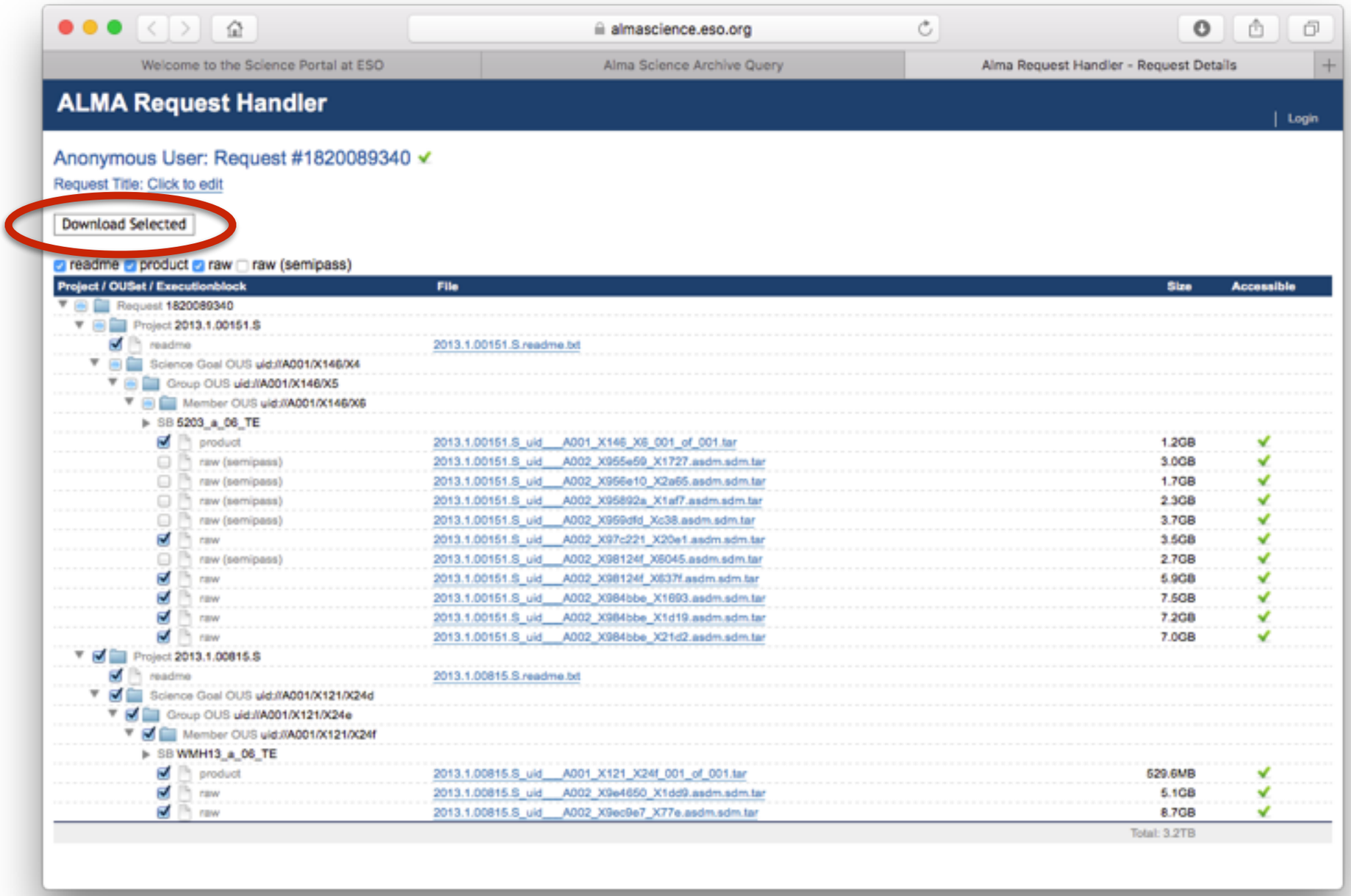

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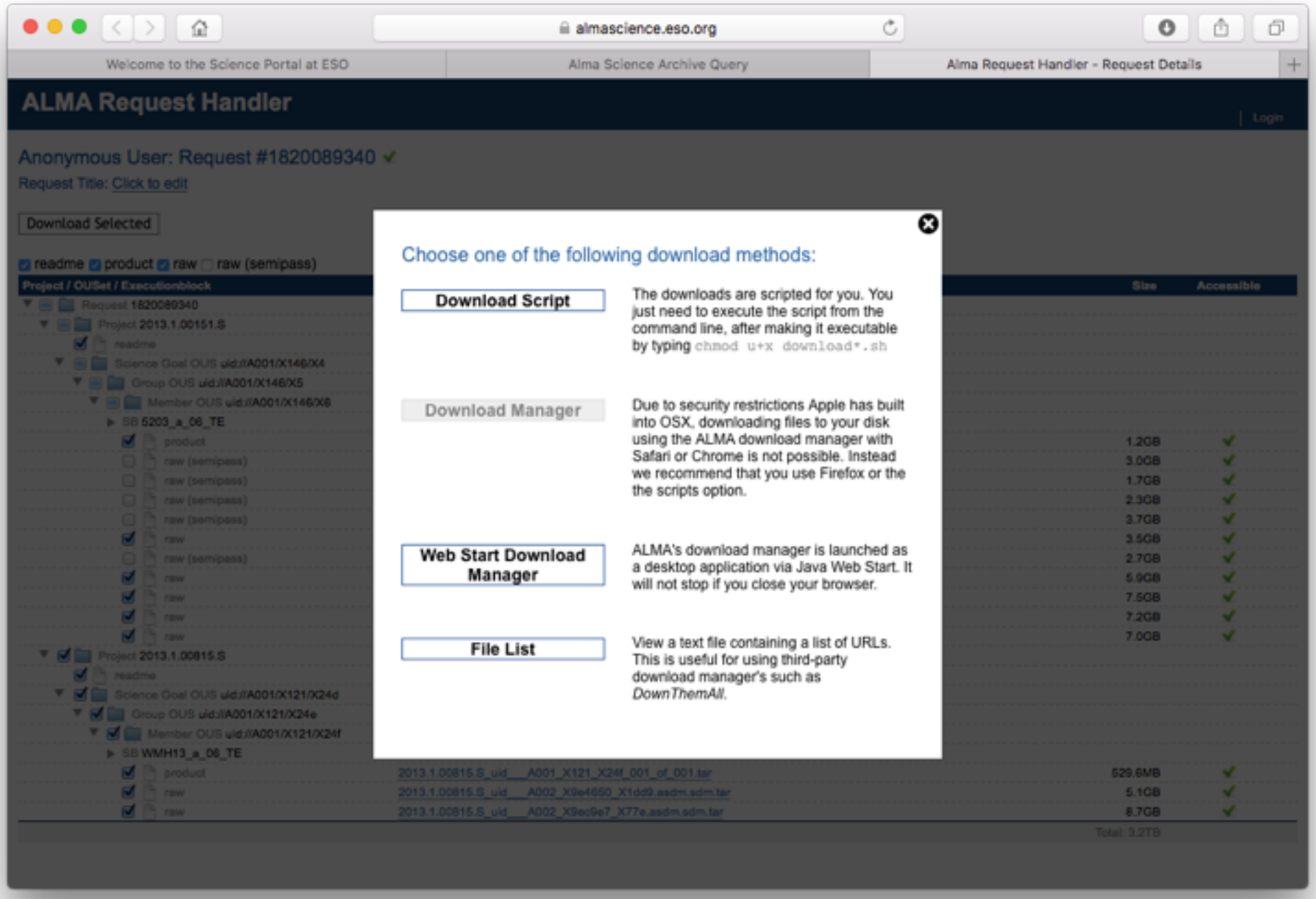

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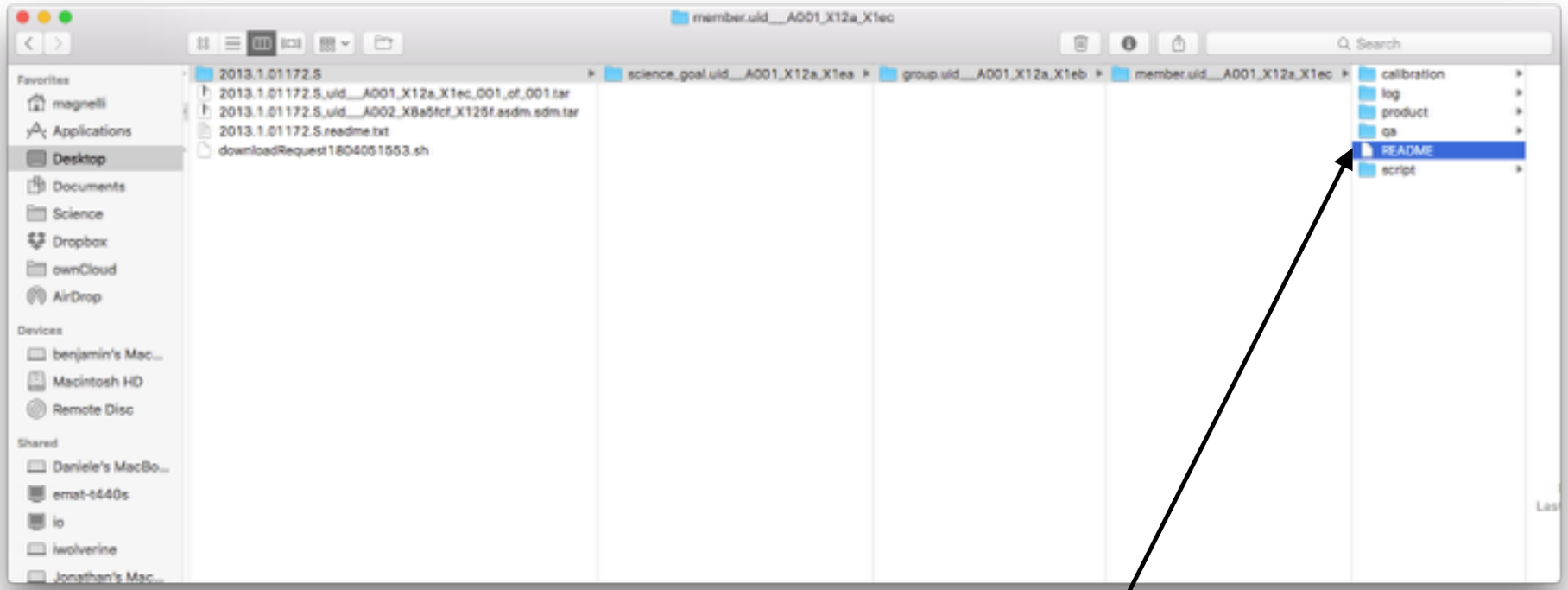

This “README” contains information about the delivered products as well as about the way to re-calibrate and/or re-image the data

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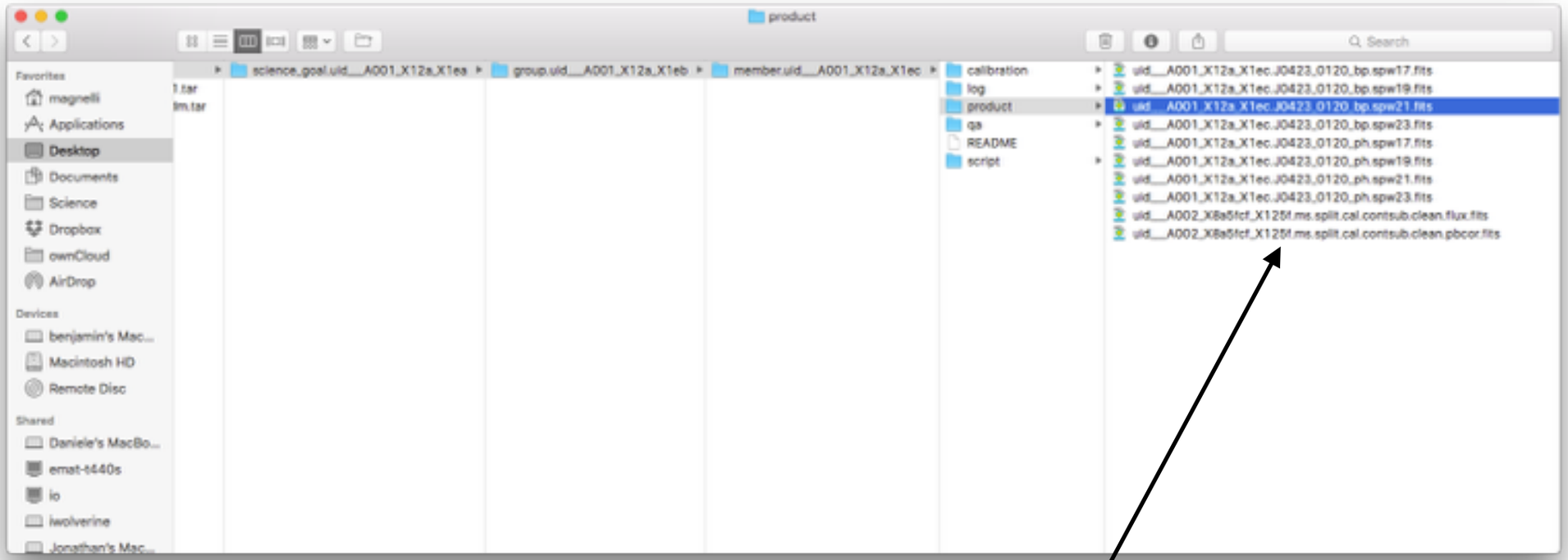

Cube produced by the QA2 analyst

Exploring the ALMA archive: ASTROQUERY

The ALMA archive can also be access programatically using the external python package **ASTROQUERY**

https://astroquery.readthedocs.org/en/latest/

ASTROQUERY allows querying and retrieving data from many large observatories including ALMA.

As a simple example, querying the ALMA Archive for the source M83 and retrieving all the corresponding data is done by

```
from astroquery.alma import Alma
import numpy
# Querying the ALMA Science Archive for source M83
result = Alma.query_object('M83')
# Extracting a list of Member ObsUnitSets
member_ous = numpy.unique(result['Member ous id'])
# Creating an ALMA astroquery instance and downloading all data the identified Member OUS
myAlma = Alma()
myAlma.cache_location = '/big/external/drive/'
myAlma.retrieve_data_from_uid(member_ous[0])
```

ASTROQUERY is the preferred way to query the ALMA archive for long lists of sources. Examples on the usage of the package for ALMA data are available at :

https://astroquery. readthedocs.org/en/latest/alma/alma.html

SUMMARY

- **The ALMA archive is a ever growing database, containing already several thousands of hours of observations**

- **The web interface and astroquery package render queries and retrieval of data from the ALMA archive very easy**

- **Many scientific breakthroughs are certainly hidden is the ALMA archive !**