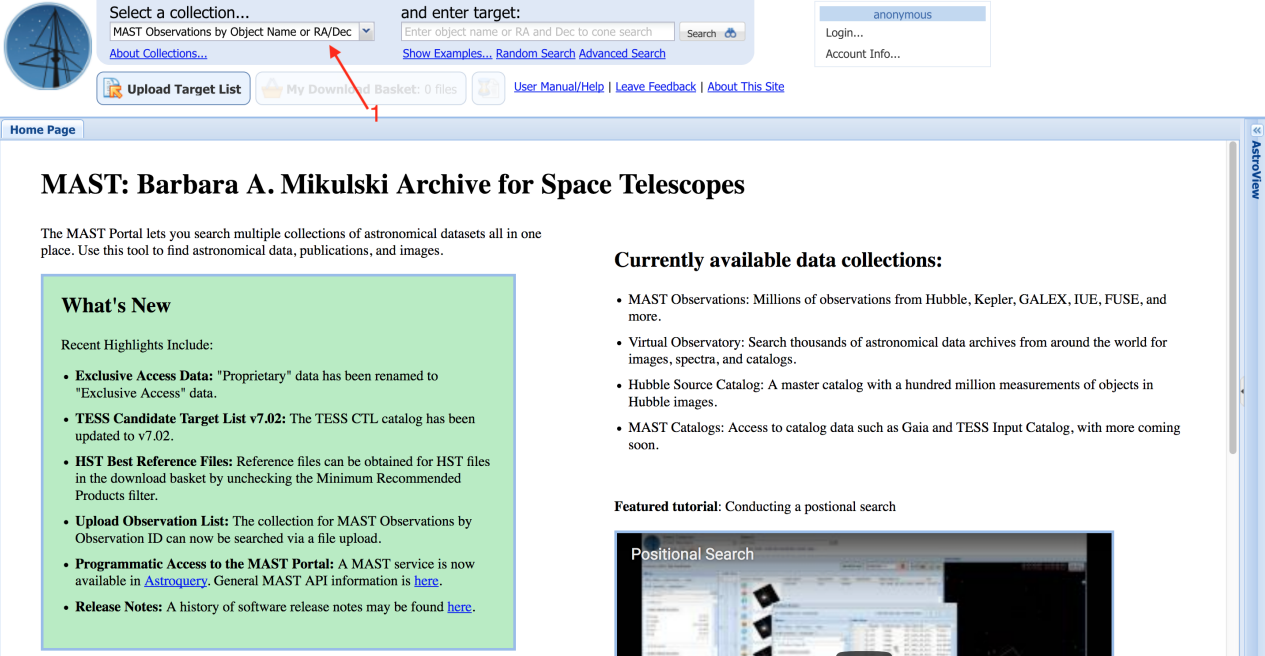


6.0.3 - Find high proper motion M dwarfs in the southern hemisphere from the TIC.

This tutorial will show you how to use the Advanced Search capability of the [MAST Portal](#). Specifically, we will be using Advanced Search to pre-select targets in the TESS Candidate Target List (CTL) that have temperatures between 2000-3500 K, declination below 0 degrees, and proper motions greater than 100 mas/year in both RA and Dec. After pre-selecting using these filters, you can either download the results, or conduct a search within that subset of the CTL.

Step 1 - Select Collection: Upon visiting the MAST Portal, the first step is to change the collection of data we are searching in from the Context menu (**Item #1**) at the top left.



The screenshot shows the MAST Portal homepage. At the top, there is a navigation bar with a logo on the left and a search area on the right. The search area includes a dropdown menu labeled 'Select a collection...' with the text 'MAST Observations by Object Name or RA/Dec' and a search button. A red arrow points to this dropdown menu. Below the search area, there are links for 'About Collections...', 'Show Examples...', 'Random Search', and 'Advanced Search'. On the right side of the navigation bar, there is a user profile section for 'anonymous' with links for 'Login...' and 'Account Info...'. Below the navigation bar, the main content area has a header 'MAST: Barbara A. Mikulski Archive for Space Telescopes' and a sub-header 'The MAST Portal lets you search multiple collections of astronomical datasets all in one place. Use this tool to find astronomical data, publications, and images.' On the left side of the main content area, there is a 'What's New' section with a list of recent highlights. On the right side, there is a 'Currently available data collections:' section with a list of data collections. Below this, there is a 'Featured tutorial:' section with a link to 'Conducting a positional search' and a thumbnail image for 'Positional Search'.

Select a collection... and enter target:
MAST Observations by Object Name or RA/Dec
Enter object name or RA and Dec to cone search
Search

[About Collections...](#) [Show Examples...](#) [Random Search](#) [Advanced Search](#)

[Upload Target List](#) [My Downloads](#) Basket: 0 files [User Manual/Help](#) [Leave Feedback](#) [About This Site](#)

[anonymous](#)
[Login...](#)
[Account Info...](#)

Home Page

MAST: Barbara A. Mikulski Archive for Space Telescopes

The MAST Portal lets you search multiple collections of astronomical datasets all in one place. Use this tool to find astronomical data, publications, and images.

What's New

Recent Highlights Include:

- **Exclusive Access Data:** "Proprietary" data has been renamed to "Exclusive Access" data.
- **TESS Candidate Target List v7.02:** The TESS CTL catalog has been updated to v7.02.
- **HST Best Reference Files:** Reference files can be obtained for HST files in the download basket by unchecking the Minimum Recommended Products filter.
- **Upload Observation List:** The collection for MAST Observations by Observation ID can now be searched via a file upload.
- **Programmatic Access to the MAST Portal:** A MAST service is now available in [Astroquery](#). General MAST API information is [here](#).
- **Release Notes:** A history of software release notes may be found [here](#).

Currently available data collections:

- MAST Observations: Millions of observations from Hubble, Kepler, GALEX, IUE, FUSE, and more.
- Virtual Observatory: Search thousands of astronomical data archives from around the world for images, spectra, and catalogs.
- Hubble Source Catalog: A master catalog with a hundred million measurements of objects in Hubble images.
- MAST Catalogs: Access to catalog data such as Gaia and TESS Input Catalog, with more coming soon.

Featured tutorial: Conducting a positional search

Positional Search

Step 2 - Select CTL Catalog: From the Context drop-down menu, select MAST Catalogs, then, in the Mission drop-down menu that appears (**Item #1**), select either **TESS CTL v7.02** for the exoCTL. Note that the version number will change as newer editions replace older ones in the Portal.

Select a collection...
MAST Catalogs
[About Collections...](#) Mission: TESS CTL v7.0.0 [Show Examples...](#) [Random Search](#) [Advanced Search](#)

and enter target:
Enter object name or RA and Dec to cone search [Search](#)

[anonymous](#)
[Login...](#)
[Account Info...](#)

[Upload Target List](#) [My Download Basket: 0 files](#) [User Manual/Help](#) [Leave Feedback](#) [About This Site](#)

Home Page

MAST: Barbara A. Mikulski Archive for Space Telescopes

The MAST Portal lets you search multiple collections of astronomical datasets all in one place. Use this tool to find astronomical data, publications, and images.

What's New

Recent Highlights Include:

- **Exclusive Access Data:** "Proprietary" data has been renamed to "Exclusive Access" data.
- **TESS Candidate Target List v7.02:** The TESS CTL catalog has been updated to v7.02.
- **HST Best Reference Files:** Reference files can be obtained for HST files in the download basket by unchecking the Minimum Recommended Products filter.
- **Upload Observation List:** The collection for MAST Observations by Observation ID can now be searched via a file upload.
- **Programmatic Access to the MAST Portal:** A MAST service is now available in [Astroquery](#). General MAST API information is [here](#).
- **Release Notes:** A history of software release notes may be found [here](#).

Currently available data collections:

- MAST Observations: Millions of observations from Hubble, Kepler, GALEX, IUE, FUSE, and more.
- Virtual Observatory: Search thousands of astronomical data archives from around the world for images, spectra, and catalogs.
- Hubble Source Catalog: A master catalog with a hundred million measurements of objects in Hubble images.
- MAST Catalogs: Access to catalog data such as Gaia and TESS Input Catalog, with more coming soon.

Featured tutorial: Conducting a positional search

Positional Search

Step 3 - Enter The Advanced Search UI: After selecting the CTL in the Context menu, enter the **Advanced Search** using the link below the search box (**Item #1**). Note: you only need to visit the link at this point, do not enter anything into the Search Box.

Select a collection...
MAST Catalogs
[About Collections...](#) Mission: TESS CTL v7.0.0 [Show Examples...](#) [Random Search](#) [Advanced Search](#)

and enter target:
Enter object name or RA and Dec to cone search [Search](#)

[anonymous](#)
[Login...](#)
[Account Info...](#)

[Upload Target List](#) [My Download Basket: 0 files](#) [User Manual/Help](#) [Leave Feedback](#) [About This Site](#)

Home Page

MAST: Barbara A. Mikulski Archive for Space Telescopes

The MAST Portal lets you search multiple collections of astronomical datasets all in one place. Use this tool to find astronomical data, publications, and images.

What's New

Recent Highlights Include:

- **Exclusive Access Data:** "Proprietary" data has been renamed to "Exclusive Access" data.
- **TESS Candidate Target List v7.02:** The TESS CTL catalog has been updated to v7.02.
- **HST Best Reference Files:** Reference files can be obtained for HST files in the download basket by unchecking the Minimum Recommended Products filter.
- **Upload Observation List:** The collection for MAST Observations by Observation ID can now be searched via a file upload.
- **Programmatic Access to the MAST Portal:** A MAST service is now available in [Astroquery](#). General MAST API information is [here](#).
- **Release Notes:** A history of software release notes may be found [here](#).

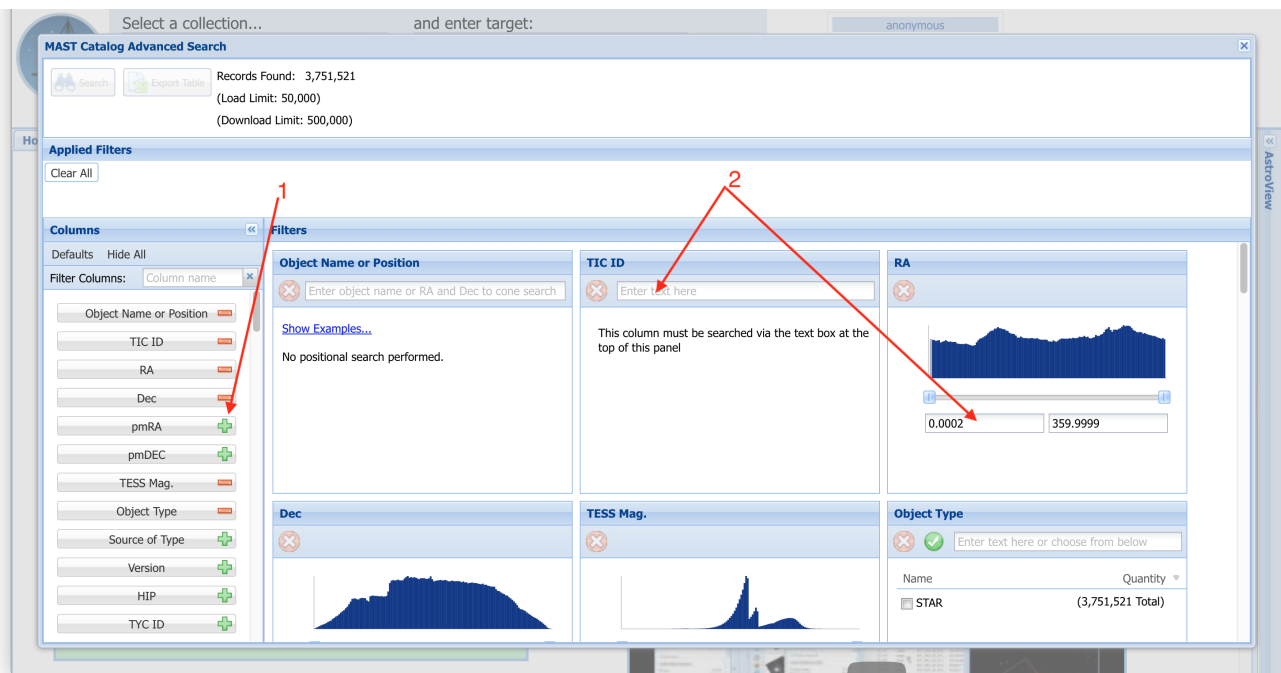
Currently available data collections:

- MAST Observations: Millions of observations from Hubble, Kepler, GALEX, IUE, FUSE, and more.
- Virtual Observatory: Search thousands of astronomical data archives from around the world for images, spectra, and catalogs.
- Hubble Source Catalog: A master catalog with a hundred million measurements of objects in Hubble images.
- MAST Catalogs: Access to catalog data such as Gaia and TESS Input Catalog, with more coming soon.

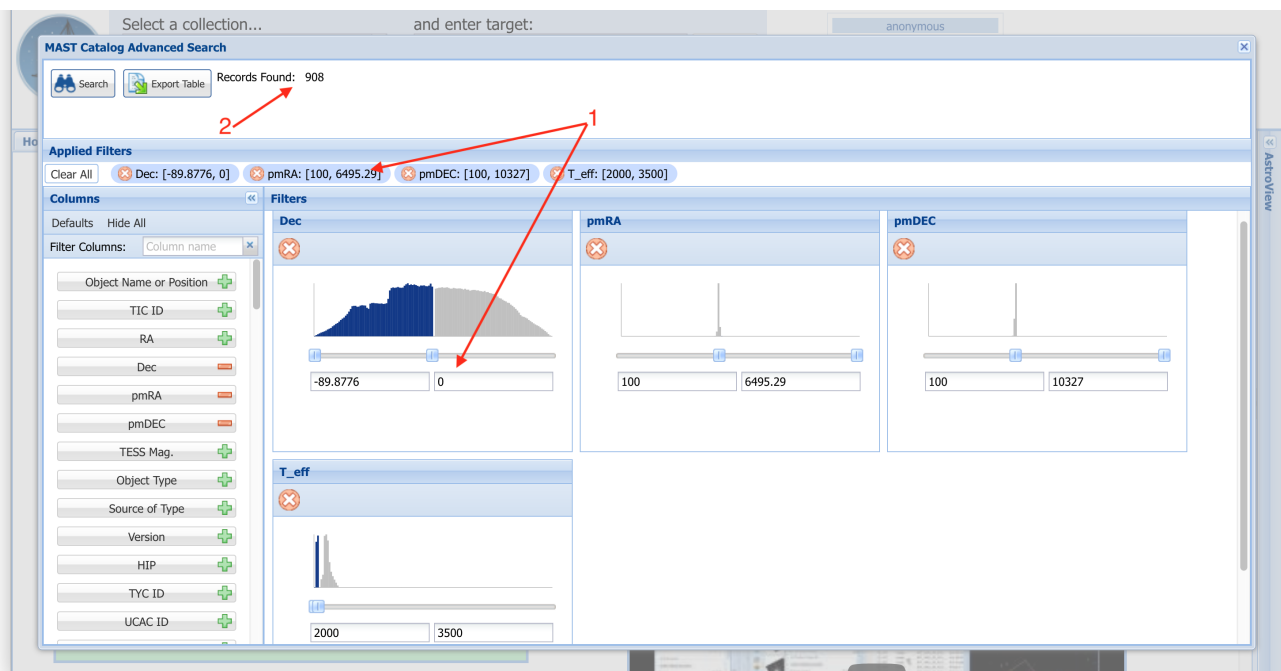
Featured tutorial: Conducting a positional search

Positional Search

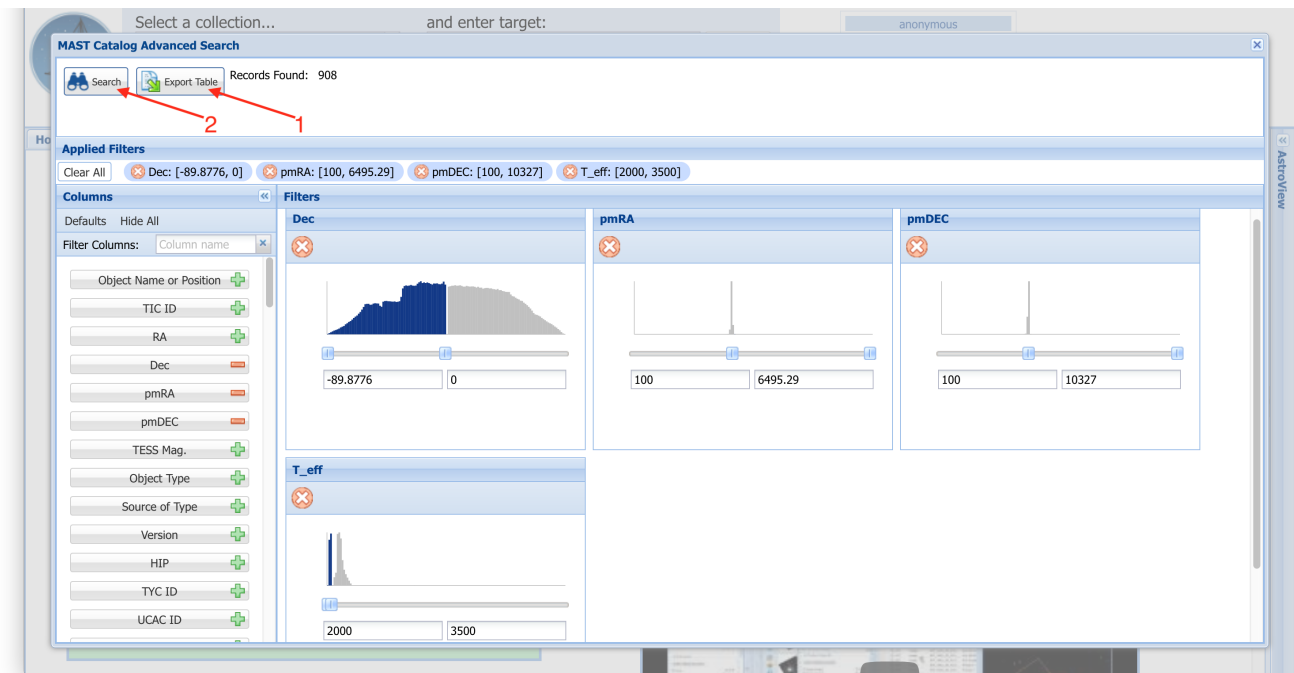
Step 4 - Choose Columns To Filter On: In the Advanced Search window, you can add (green plus symbols) or remove (red minus symbols) panels that can be used to apply a pre-search filter on any of the available columns (**Item #1**). When you add a panel, it will show up on the right side of the window, where you can apply limits on the ranges for numerical columns, or constraints in text fields by entering some text, including wildcards (**Item #2**).



Step 5 - Apply Filters: In our example, we'll remove all the sub-panels except for **Dec**, **pmRA**, **pmDEC**, and **T_eff**. It's not necessary to remove panels if you don't want to filter on them, but we do here for clarity. We filter 2000. < T_eff < 3500. K, declination less than 0 degrees, and require both RA and Dec. proper motions are larger than 100 mas (Item #1). As you apply each filter, the Portal will apply it and keep a running total of the number of return rows in the top-left (Item #2).



Step 6 - Export or Load Your Query Results: Once your filters result in less than 500,000 rows, the option to **Export** the results will become active (Item #1). You can then specify an output file type and file name to save those rows to your local machine. If your filter results in less than 50,000 rows, the option to **Search** (load into the main Portal window) becomes active (Item #2). Since the number of returned records is small, let's load them back into the main Portal window using the **Search** button.



Step 7 - Continue Interacting With Query Results: Having loaded our Advanced Search results into the main Portal, we see they are stored in their own tab (Item #1). Once loaded, we can continue to interact with the results using all the features of the Portal, including that ability to apply additional filters, save the results to your local machine, and see the footprints of the catalog sources on the sky with AstroView (Item #2).

	Actions	TIC ID	RA	Dec	pmRA	pmDEC	TESS Mag.
1		425999378	01:49:22.416	-68:32:31.56	231.68	158.26	14.179
2		304104114	01:52:09.216	-76:49:41.16	158.91	113.44	14.694
3		146730209	03:01:57.648	-42:34:22.80	224.37	250.53	14.918
4		176799478	03:14:55.200	-35:24:54.36	407.37	140.27	14.174
5		72581817	02:03:29.712	-25:10:22.08	107.65	146.38	15.737
6		164771802	01:46:52.176	-21:37:11.28	177.24	170.81	14.304
7		471012354	02:32:42.216	-27:37:23.16	728.17	400.17	13.299
8		115276426	01:44:54.840	-39:41:53.16	274.93	120.32	12.067
9		263080521	01:12:23.472	-79:39:12.96	291.11	121.07	13.115
10		184134686	01:28:34.584	-75:19:06.24	128.65	112.93	13.07
11		401835856	01:43:41.976	-47:57:14.76	199.25	186.01	14.549
12		259847258	02:38:49.176	-71:42:03.60	241.84	120.21	14.214
13		66553625	01:08:55.536	-14:57:40.32	103.18	182.17	11.453