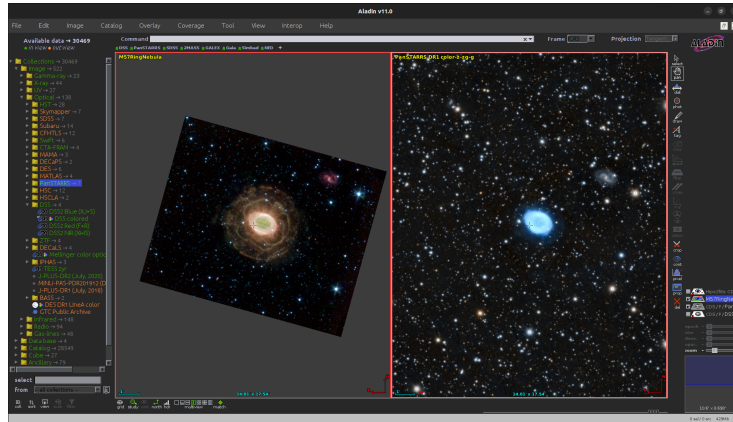


Astrometric calibration using Aladin



F. Rothmaier, M. Demleitner, S. Gabriel

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Abstract

The Aladin Sky Atlas is a very powerful Virtual Observatory application enabling its users to visualise digitised astronomical images, to superimpose entries from astronomical catalogues or databases, and to interactively access related data and information from numerous astronomical databases and archives.

Most of this functionality depends on the image having an astrometrical calibration. If you do not know the sky region of an uncalibrated image, an automatic calibration tool like [Astrometry.net](https://astrometry.net) might be a good choice. If you know, however, the approximate location of an image on the celestial sphere, Aladin provides a fast and reliable method to calibrate it by using a reference image.

This tutorial explains step-by-step how to perform such an ad-hoc astrometric calibration using Aladin.

Software: [Aladin](https://aladin.cesr.cnrs.fr/)


Learn how to calibrate an image with Aladin

▷ 1 *Load an uncalibrated image into Aladin* –


- Launch Aladin.
- Paste the URL

<http://docs.g-v-o.org/astropics/M57RingNebula.jpg>

into Aladin’s **Command** field on the top of the window. This opens an uncalibrated image of the Ring Nebula (Messier 57). (Alternatively, you can open a web browser with <http://docs.g-v-o.org/astropics/>, download the file *M57RingNebula.jpg* and access it via Aladin’s menu: **File** → **Load local file...**).

- ▷ **2** *Get a calibration source* – Since our image is in a spectral range rather close to PanSTARRS’, we will use that as a reference. You can simply click on the PanSTARRS bookmark just below the command window – or use the discovery tree on the right side and look for PanSTARRS there. For images in other spectral ranges, you would probably want to use a different survey.
- ▷ **3** *Go to the rough area of your image* – In this case, we know our image shows the ring nebula M57, so type **M57** into the **Command** field and hit enter; the view will now center on M57. For images for which you can guess the position, type in the RA and Dec instead. Then zoom in until you properly see the target object (in this case, that’s about 20 arcminutes). You can use the zoom slider on the right side or a mouse wheel for zooming.
- ▷ **4** *Calibrate your uncalibrated image* –
 - Split the main window into two sub-windows by using the middle button of the “multiview” capability . Make Aladin display your uncalibrated image in the left and the calibrated image in the right sub-window (to do that, drag and drop the entries in the layer stack on the right into the panes).
 - Click in your left panel (the uncalibrated one), then choose **Image** → **Astrometrical calibration...** in the menu. A new window opens where you should select the option **by matching stars**.
 - If you are sure about corresponding stars in the two images, click on a star in the uncalibrated image followed by a click on the calibrated source. Repeat the game for at least five objects. For each mouse click, Aladin fills the table in the calibration dialog. Use your common sense and the human ability to form asterisms to guide your choice: Stars close to galaxies should be easy to pair up, or conspicuous triangles of stars of comparable brightness.
 - When you feel good about your objects selected, press the **CREATE** button to finalise the calibration.

▷ 5 Verify that your image is calibrated

- If you hover your mouse over the image on the left, you see that coordinates are indicated in the “Command” field above the main window (before there was a “No astrometrical reduction” here).
- Click on the “match” icon  (to the right of the “multiview” capability) to view the two images in the same orientation. You should now see something along the lines of the title picture
- If you want to save your freshly calibrated image on disk, go to the menu **file** and choose **Export planes (FITS,VOTable,...)**....

Warning: if you have already overplotted a catalog over your calibrated image, Aladin will use the closest catalog object rather than the position you actually clicked. It's not unlikely that's actually what you want, but sometimes it's not...