ISYA 2012

Exercise 2 - Aladin: The Amateur Virtual Observatory

Summary

Load an image with overlays in **Aladin** and explore the interface. In this exercise we will load an image with overlay into the **Aladin** Viewer and look at some of the features of the interface. This will allow us to practice using the features of the interface. One thing to beware of the interface has no 'undo' button so if you press delete at the wrong time you may have to start again or at best reload the data.

The activity

1. Click on the **Aladin** icon on the desktop of the PC/laptop.

2. In the command box type '**M1**' and press **enter**. The command box should briefly show '**resolving**' as it converts **M1** into it's position on the sky. (Tip: If you get lost you can always just type M1 in the box and it should get back to the starting position, you have to highlight the position so you can overtype it)

3. Aladin should then load an image of **M1** from **DSS2** (2nd Digital Sky Survey) together with a **Simbad** and **NED** (**NASA/IPAC Extragalactic Database**) overlays. Most Objects in **Simbad** are in the Milky Way and most in **NED** are outside the Milky Way. Use **Simbad** for stars and **NED** for Galaxies.

4. Looking at the display there is a star shown on the right with a long red arrow. This indicates the star has a high proper motion and is now located at the end of the arrow rather than the position on the original image.

5. The two overlays are shown in '**The Stack**' on the right hand side. Normally **Simbad** will show up as red and **NED** as blue. These colours are used to identify the items on the overlay to the image. For the moment envisage the stack as a pile of slides viewed from the top of the screen where the 'eye' is where the catalogue data such as **Simbad** & **NED** are transparent so you can see what is below them and the image is translucent so you can't see through it. Therefore you always see the top image that is active.

6. If you look closely at the image you should see that there are both blue and red symbols. The colour indicates which catalogue the object is in either **Simbad** or **NED** in this case and the symbol itself indicates the object type. For instance **stars** are **crosses** and **galaxies** are **ellipses**.

7. If you look at the stack there is a small box on the left with a tick in it – this indicates that that particular plane is active. Try clicking on each in turn once starting from the top. With each click the tick box will turn off and that particular plane will no longer be shown on the image. You will eventually end up with a blank image – **Aladin** has still selected **M1** but nothing is shown. The cursor will still be shown and remain on **M1** unless you clicked elsewhere in the field.

8. Now repeat the procedure – tick on the empty boxes starting from the **Simbad** row. Note you get the **Simbad** objects only floating in space. Now click on the boxes on the other **NED** plane to turn these on note that very few of the **NED** objects are coincident with the **Simbad** objects as you would expect as **Simbad** covers the Milky Way and **NED** things outside the Milky Way.

9. While you just have the catalogue objects shown try selecting one of the objects away from the centre, just click nearby and drag the cursor across one of the **Red Simbad** objects – a green box should appear. Release the mouse button and the green box will shrink to just the object. Details of the object will then appear in the box below the main window. The most important being the name, **OTYPE** (Object Type) and brightness in various bands. Note as you move the cursor across the boxes a more detailed explanation of the contents of that column appears at the top of the list. You can get more details on the **OTYPE** by clicking on the blue link for the object you have chosen. Click on the **OTYPE** link and a new browser window should open showing the short codes for different sorts of objects in Simbad.

10. Select a Blue (**NED**) object in the same way you will see a different set of data is shown. You can also select more than one object – drag the selection box across a group of objects about 5 or 6 is best from both **Simbad** and **NED**. When you release you mouse button note how all the selected items have green boxes round them.

11. The list of objects will be shown in the table below the image. Move your cursor around the rows – note how the column headings change as you select either **NED** or **Simbad** objects. Leave the pointer over one of the rows – note how the selected object flashes so you can see where it is.

12. Now turn the image in the bottom plane of the stack on by clicking in the box. You should have now got the original image and overlays back though the purple cross cursor may have moved.

13. The order of the overlays and the images in the stack can be changed. Try clicking on the **Simbad** plane and dragging it below the image plane. When you release the mouse button the **Simbad** plane should move to the bottom of the stack. Note how it turns off the tick box as it can't be seen through the translucent image. If you click on the box to turn the **Simbad** plane on the image plane will turn off.

14. Now drag the **Simbad** layer back up the stack and turn any planes that are off on.

15. Next lets explore the plane properties. Select the **NED** layer by clicking to the right of the word **NED** in the stack it should show the plane as selected in blue. Moving the cursor over the top of the word **NED** shows how many **NED** objects are in this plane in the stack. Double clicking on this would select all the **NED** objects. Also while we are here note the small while slider on the bottom of the **Catalogue Data Symbol** for **NED** and **Simbad**. Click on this and drag it to the left to make this plane more transparent – note the **NED** symbols fade and the **Catalogue Data Symbol** goes from dark to white.

16. Before we zoom into the centre of the nebula we need to make the **NED** lay a bit more visible against the dark nebula. Select the **NED** plane if it is already selected and right click with your mouse. From the list that comes up select '**Properties**'.

17. A new window should pop-up showing the properties for this plane of the stack. From this window you can change the opacity – just as we have done with the slider, filter objects though **NED** does not generally show the object type so this will not work for **NED** but would for Simbad. We need to change the symbol colour for something that is more visible against a dark background – select the bright Cerise Pink and then click the apply button. Note that the symbol colour for **NED** changes both on the stack and on the image. Finally click the close button to close the pop-up.

18. The zoom level should still be set to one but you might have accidentally altered it. If so select zoom level one from the drop down box. Now select the objects in the centre of **M1** by dragging across them. You should have selected about 7 objects – the total selected is shown in the bottom right of the display as '**7 sel / 122 src**'.

19. Scroll up and down the list until you find the one with an **OTYPE** of Pulsar. Interestingly **Simbad** knows it as the variable star '**CM Tau**', it is a variable – it flashes 30 times a second in the optical.

20. You can click on the star name which will open a new window with the details from the **Simbad** database. Try this if you like but come back here for the rest of the exercise.

21. Next click on the tick box to the left of the star name – this moves the cursor to this object. You can now zoom into the **Crab pulsar** location – you can either use the wheel on your mouse if it has one or else select the zoom level from the drop down box.

22. Zoom in till you are at 32x – the pulsar is at the cursor position. To see what the other nearby selected objects are move the pointer over them – they should flash and the appropriate object in the list below should be highlighted.

This ends the exercise. You might want to experiment some more – for instance select the properties of the Simbad Plane and use the filter to select certain objects. (Tip: Turn of the NED plane can see the Simbad objects that are selected more clearly.)

This exercise has introduced you to the Aladin interface – there are lots more features some of which we will explore in future exercises and some of which are left for you to discover or to find from the manual. There are several ways of achieving the same thing in Aladin so you find an alternative you like use it.