

## Creating Graphs and Plots from MCP Data in Origin9.0

(By Angelos Laoutaris)

### 1. Importing the Data- Converting to Matrix

- First open a new workbook (click on the new workbook icon) and activate it by clicking on it with the cursor.
- File-> Import-> Single ASCII (Figure 1).** Currently, we import text files with \_1 ending (i.e 140919-121147-W=1000,Ben,1800s\_1.txt). After that we get a three column matrix with three headings A(X), B(Y), C(Y). Here you might also want to add some comments in the comment section of the Workbook (**Properties**)
- Selecting the third column C and by right clicking on it, we set it as Z. At this time you might also want to edit the column headers and put appropriate names etc. (channel numbers, counts, etc.)
- Select all three columns and select **Worksheet-> Convert to Matrix-> XYZ Gridding-> Open Dialog... (Figure 2).**

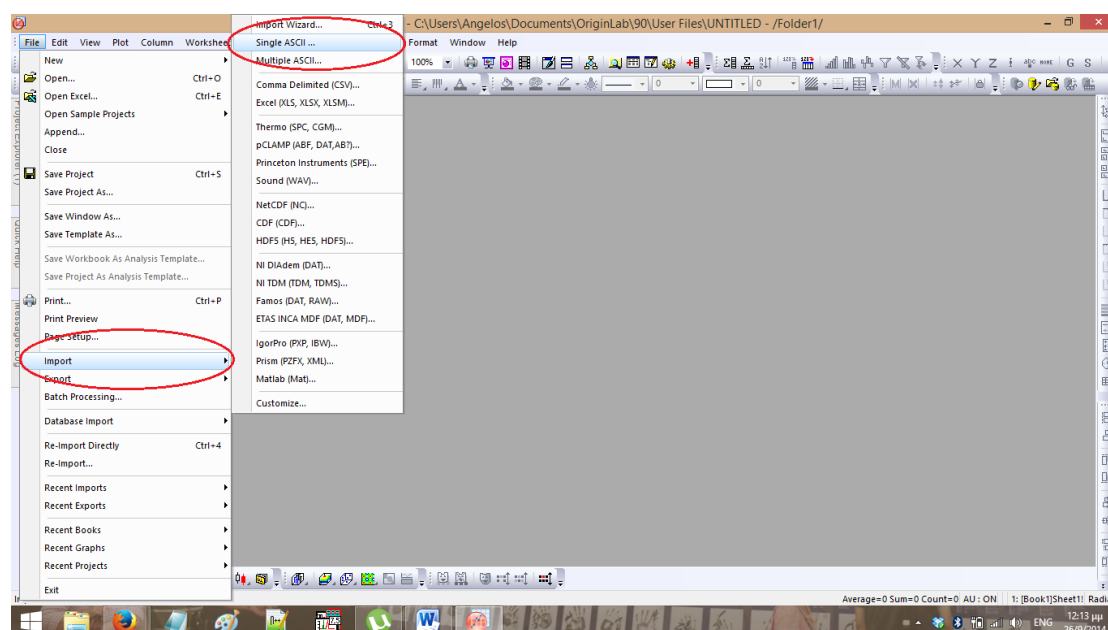
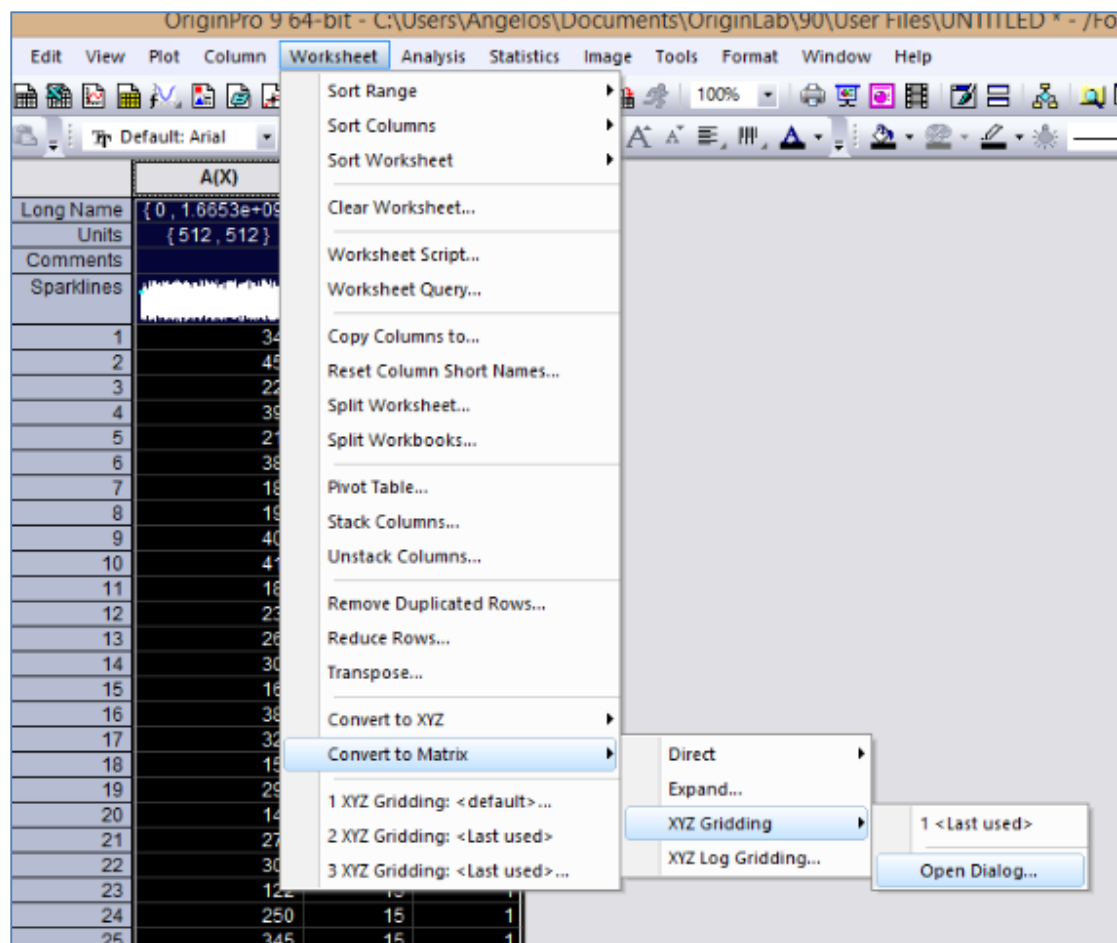


Figure 1: Importing the data



**Figure 2:** Converting the data into a matrix.

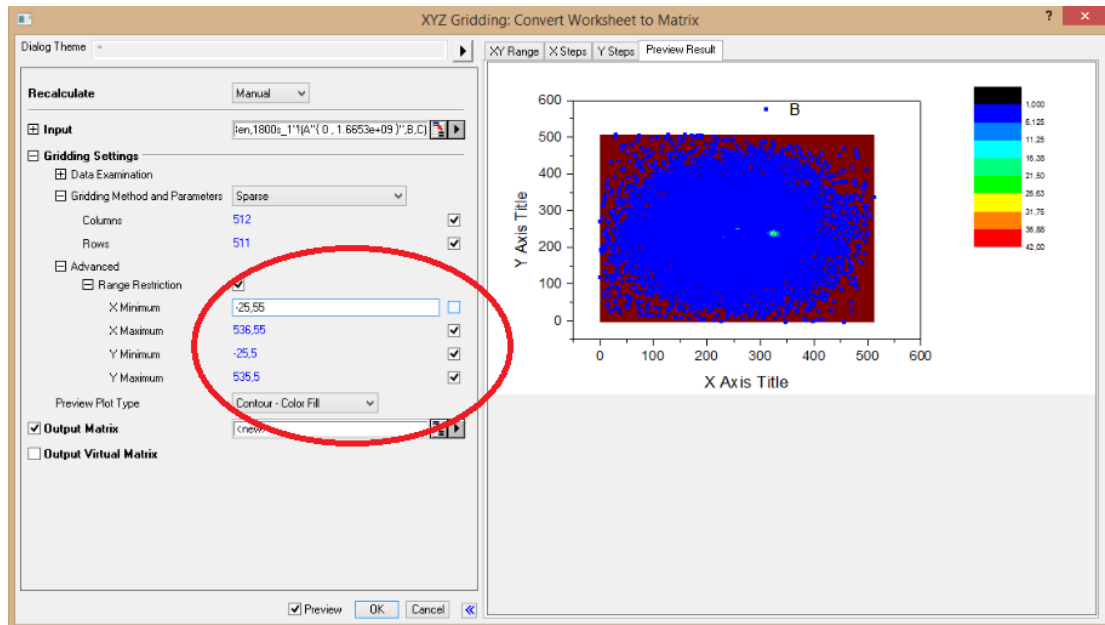
A crucial point here is to select the correct scale of the graph that we want eventually.

Typically for our usual MCP2 DAQ data sets the binning is already done (512 x 512 or 256 x 256, etc.) and you can check it (select **Gridding Settings-> Advanced->Range Restriction**) – it should show the total number of channels in each of the x and y directions which should be 512 and 512 see Fig. 3 (note a small error here the y shows 511 – it should be corrected to 512).

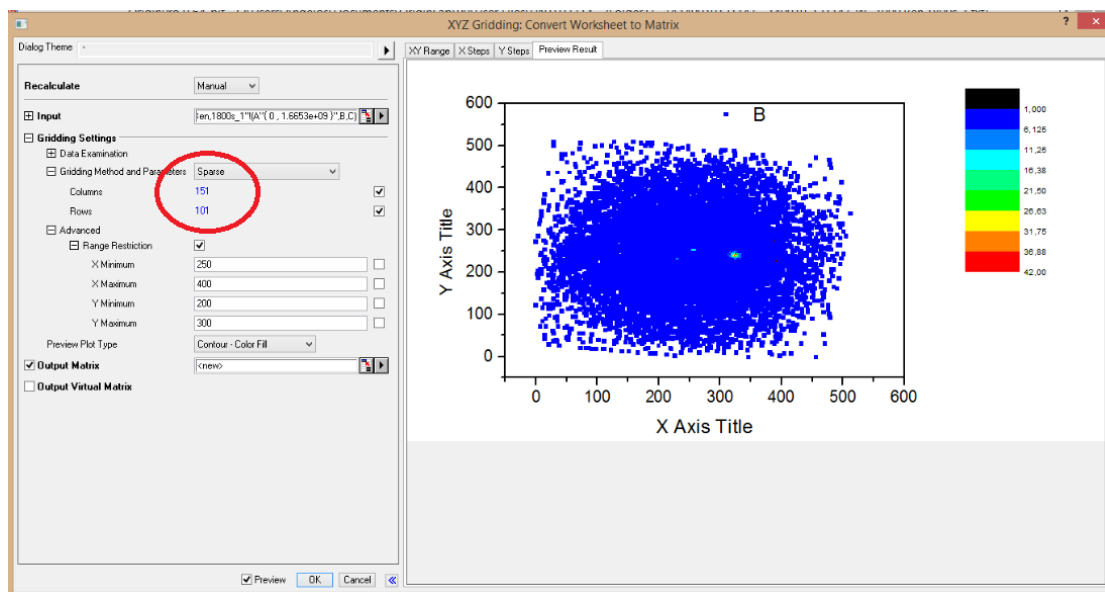
Please note that the 2-D data sets (.txt) produced by MCP2 DAQ program is a sparse data set (i.e. it only records the channels numbers (x,y,z) for cells with **non-zero z** (z is the counts!) to save disk space. This can be readily reconstructed into a full 512 x 512 matrix with 0 (or --) in cells with zero counts by the above procedure if the **sparse** option (this is the default!) is chosen in the setting

If however you will need to plot a subset of this you might need to change it as shown below.

In **Figure 3** we can see the options we have when we create the matrix, and on the right side, a preview of the result. At this point we must select **Gridding Settings-> Advanced->Range Restriction** and **uncheck** the **X Minimum, X Maximum, Y Minimum, Y Maximum** values, in order to insert the ones we want manually.



**Figure 3:** The window with the matrix creation options



**Figure 4:** As we change the Range of our data we can see that also the number of Columns and Rows changes automatically. This indicates that these two parameters are connected.

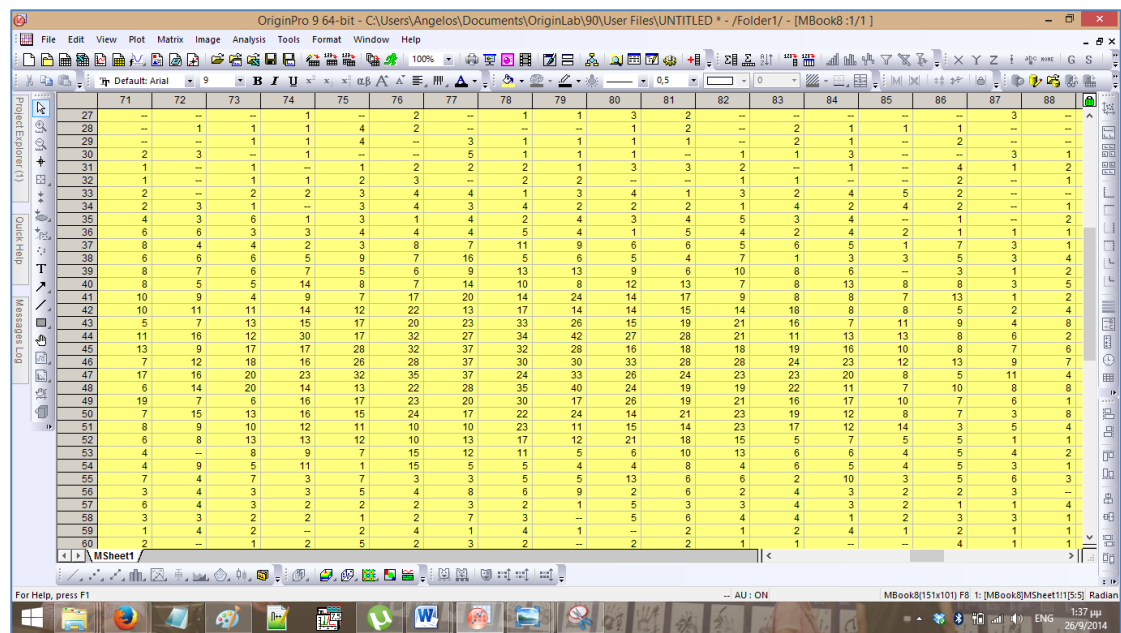


Figure 5: Our data in a matrix form

## 2. Creating Colormap Surface with Projection Plot

At this point we are able to create some plots. By selecting **Plot-> 3D Surface-> Colormap Surface with projections (Figure 6)** we get an image as seen in **Figure 7**.

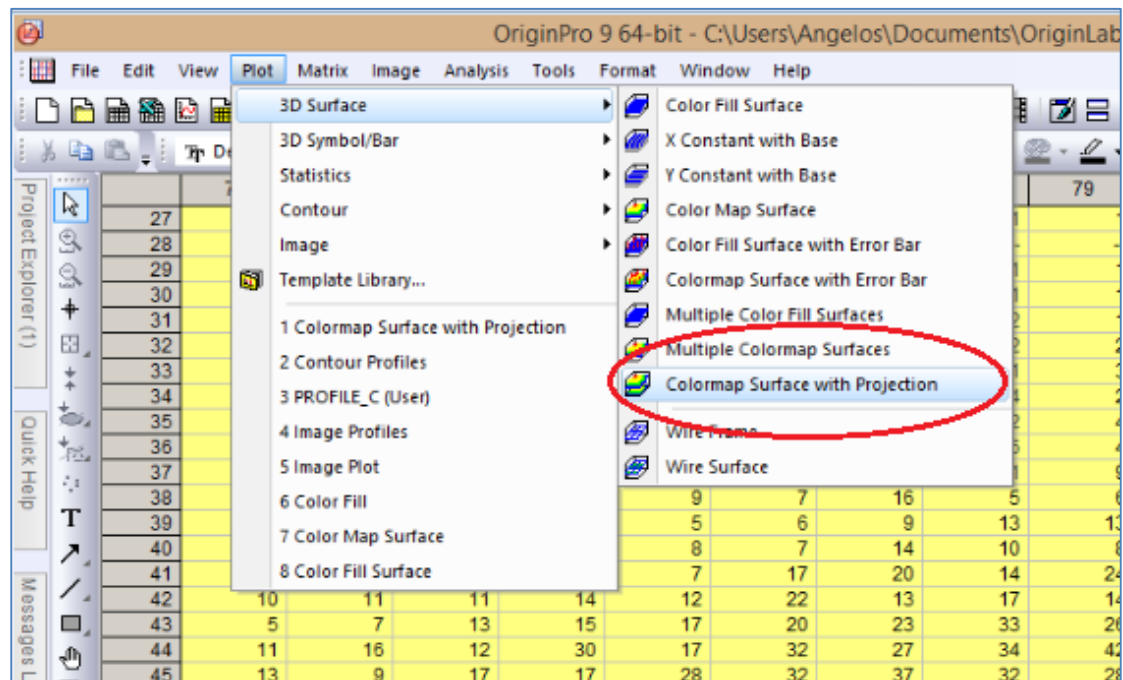


Figure 6

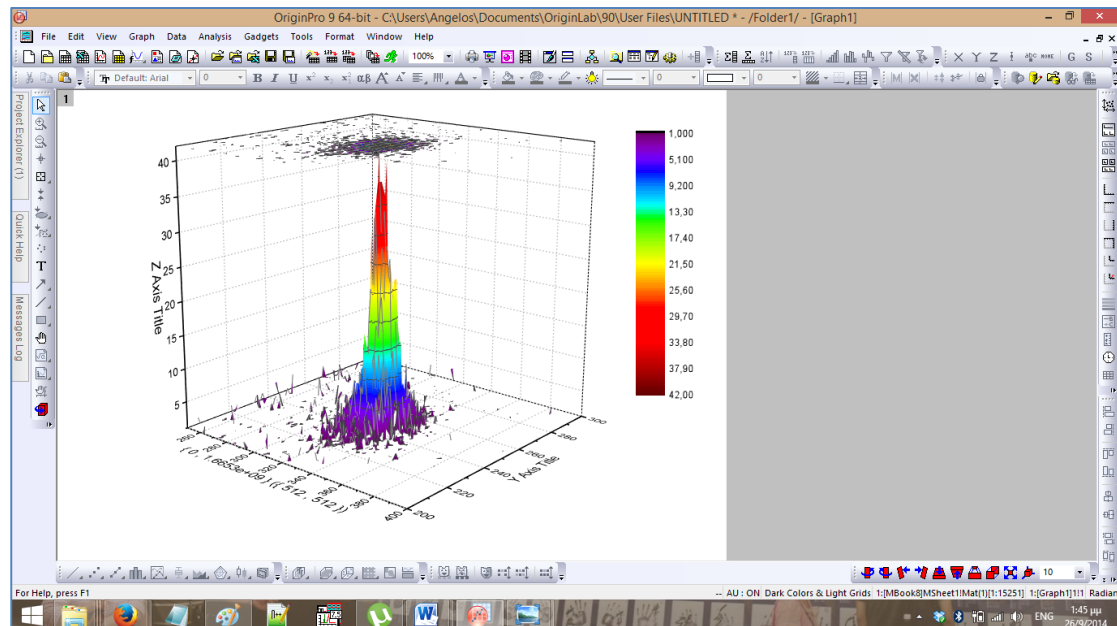


Figure 7

In order to have an agreement between the colormap of the surface and the scale or the right, we **“right-click” on the scale -> Properties-> Reverse order (check) (Figure 8)**. The result is shown in **Figure 9**.

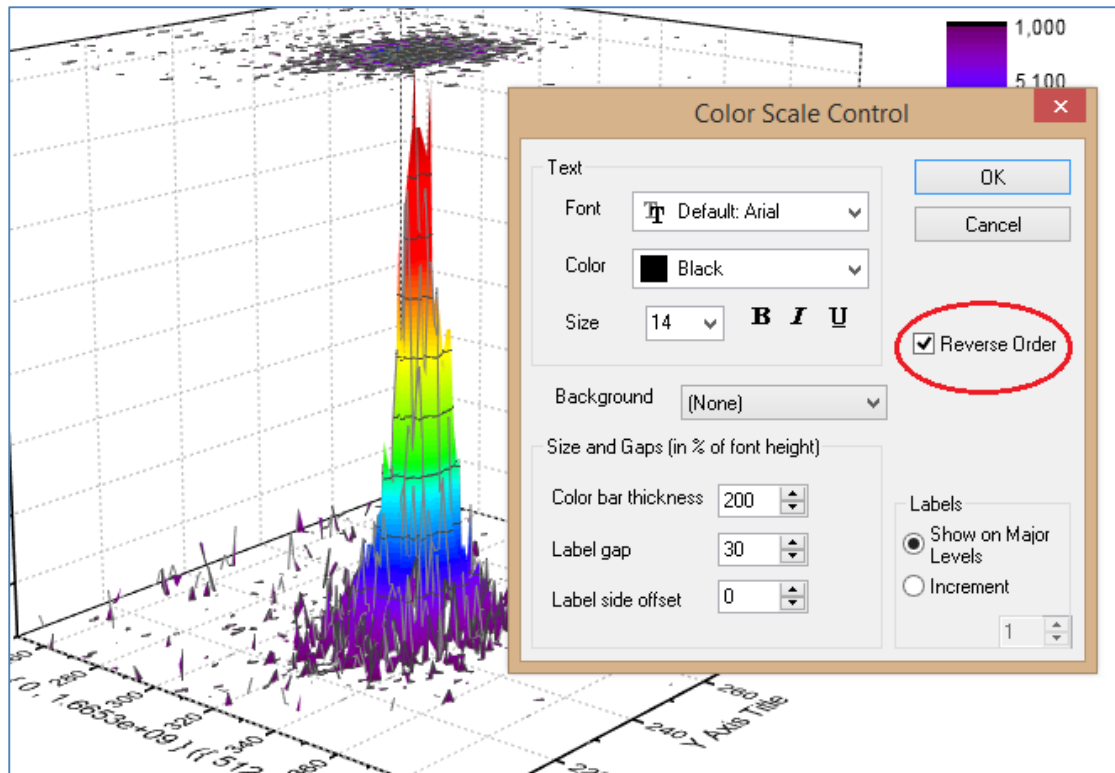


Figure 8

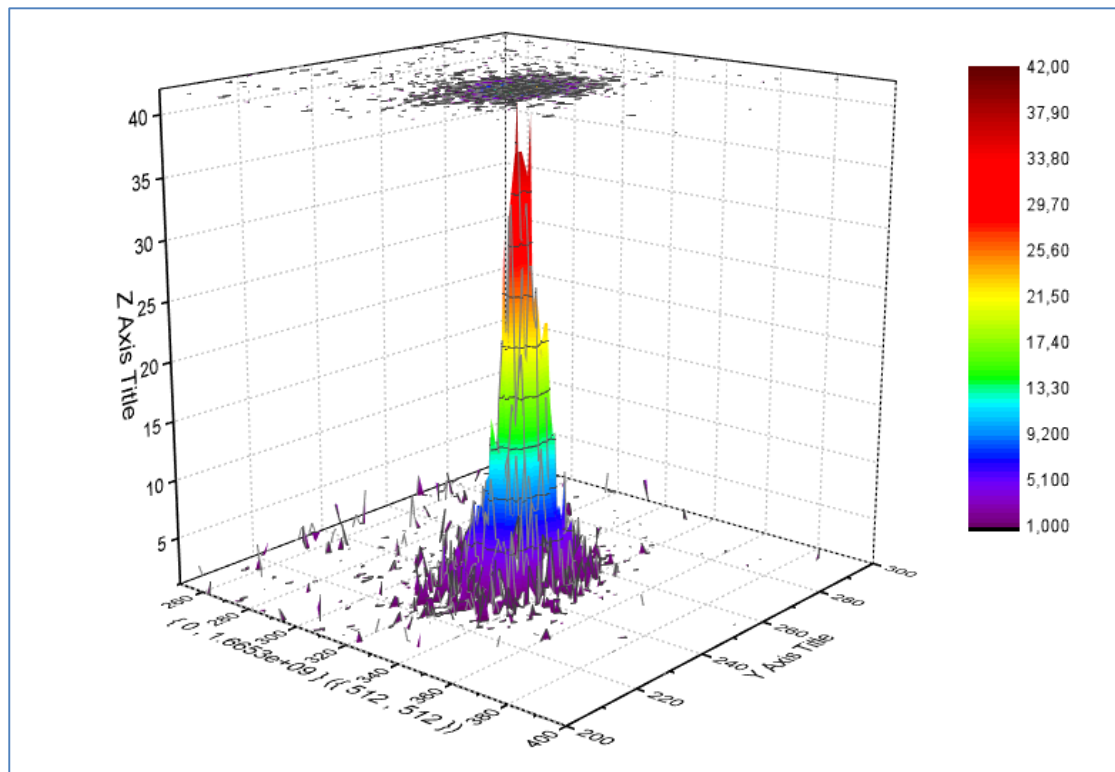


Figure 9

### 3. Creating Contour Profiles plot

The next plot we want to create is a **Contour with Projections** plot. In order to do that we must select: **Plot-> Contour->Image Profiles (Figure 10)**.

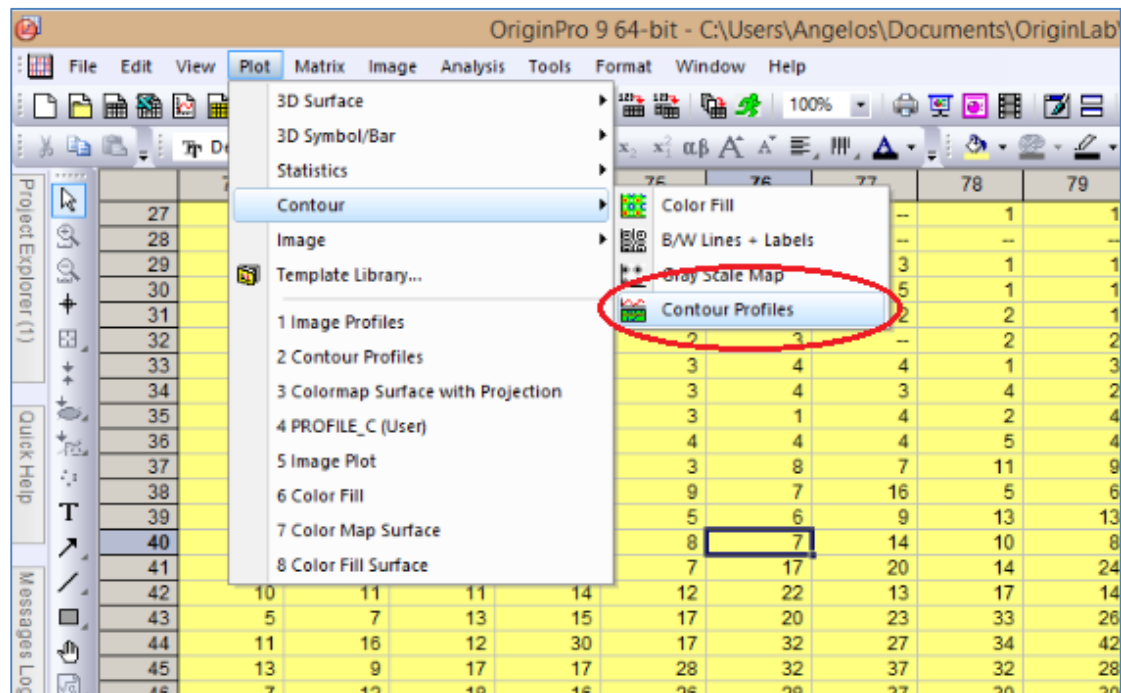


Figure 10

The result is an image like the one in **Figure 11**. At this point we can select the coordinates of **VLine** and **HLine** in order to show the vertical and horizontal projection of our range of interest, by picking the line with the cursor, or change the value of **X** and **Y** in the **Image Profile** Window. Besides that, we can also select the width of these lines by increasing or decreasing the number of **Pixels** or changing the **Scale**.

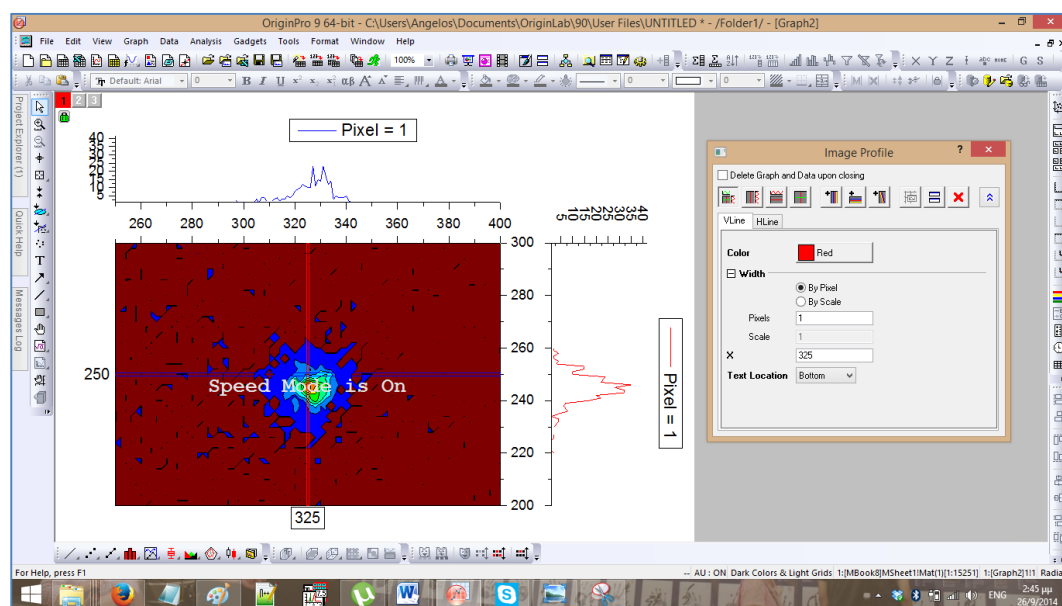


Figure 11

After selecting our region of interest we can erase the pixel coordinates from our plot by “right-clicking” on them and selecting **Programming Control-> Visible (uncheck)** (**Figure 12 and 13**). We repeat this process for the other axis as well and the result is shown in (**Figure 14**). (Be carefull not to check the lines by accident. The same procedure can be done to erase the V,H lines). In order to proceed the **Image Profile** Window must be closed, however by clicking the **Profile..** button, in the upper right region of the plot, it can be restored.

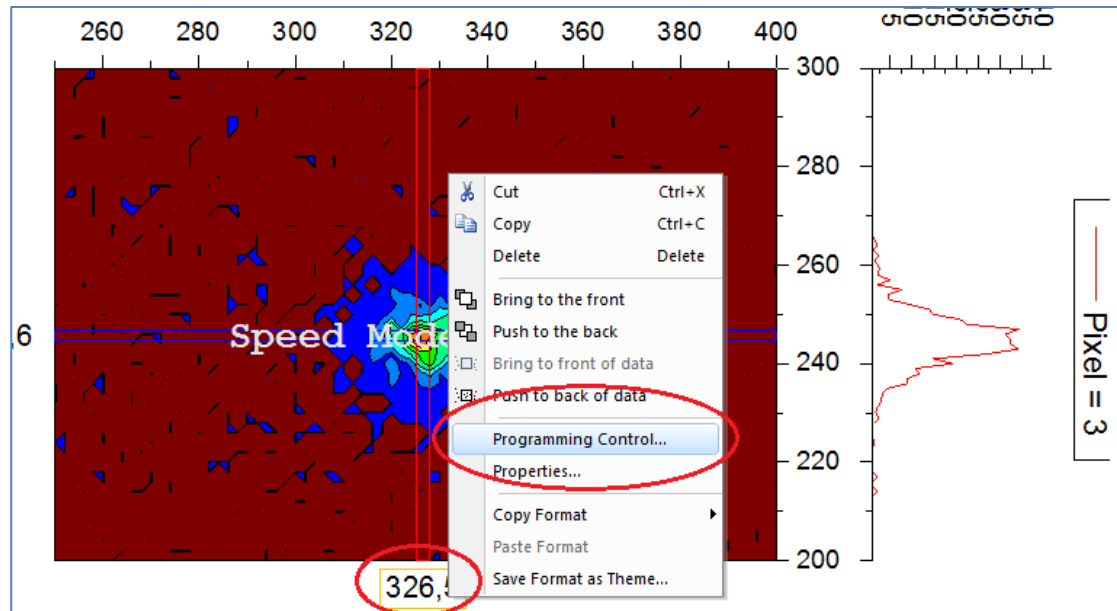


Figure 12

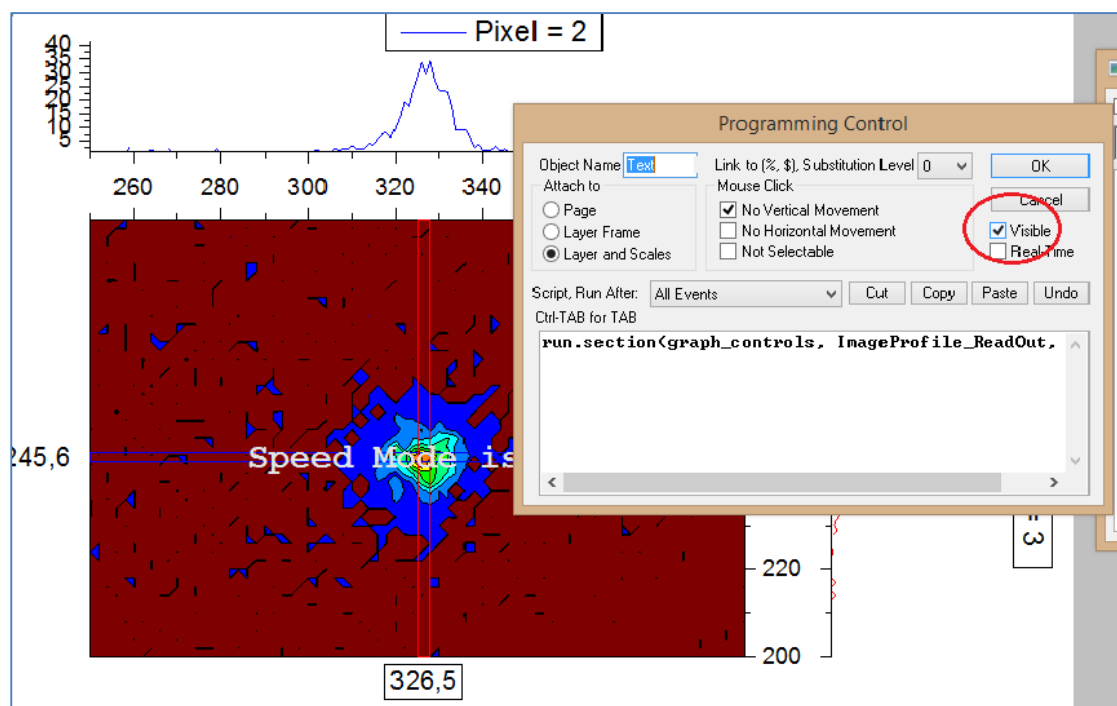


Figure 13



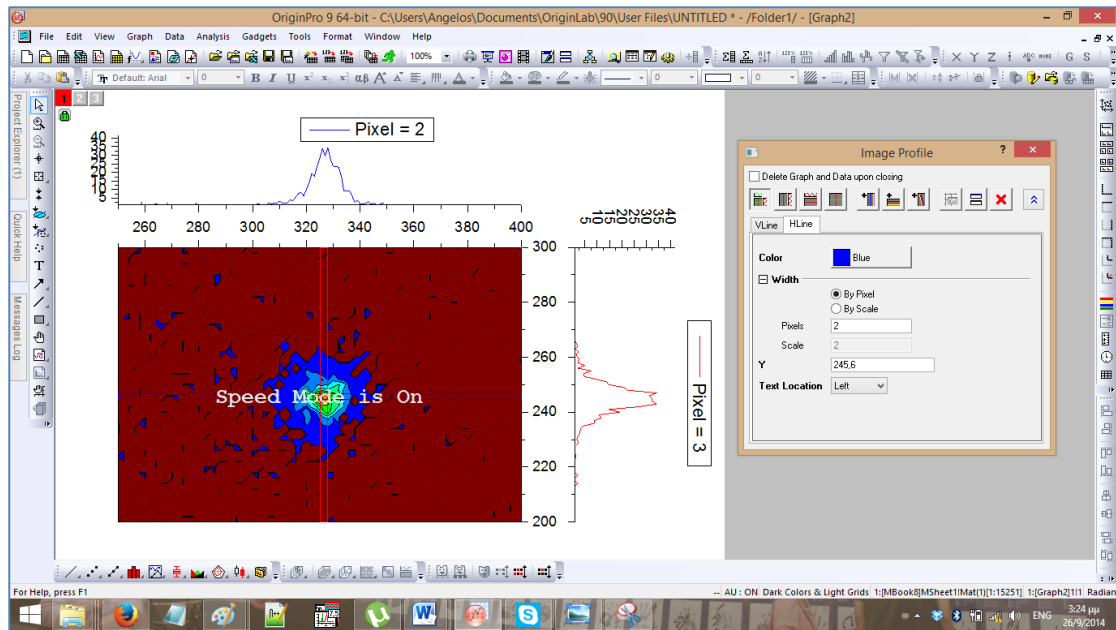


Figure 14

Matching the two Colourmaps.

By double-clicking the contour image a **Plot Details-Plot Properties** window appears. In this window the colourmap settings can be changed so the **Contour with Projections** plot and the **Colourmap Surface with Projection** plot, match.

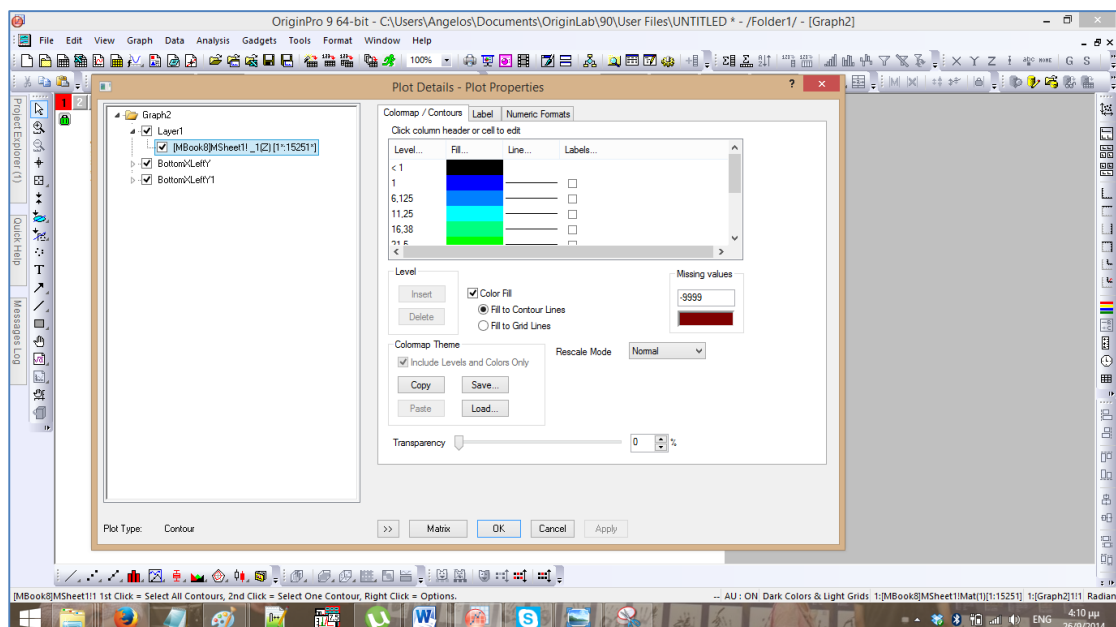


Figure 15

In order to match the two colormaps we must select the **Fill** option as shown in **Figure 16**. After that we must select **Load Palette-> Select Palette-> Rainbow (Figure 17)**.

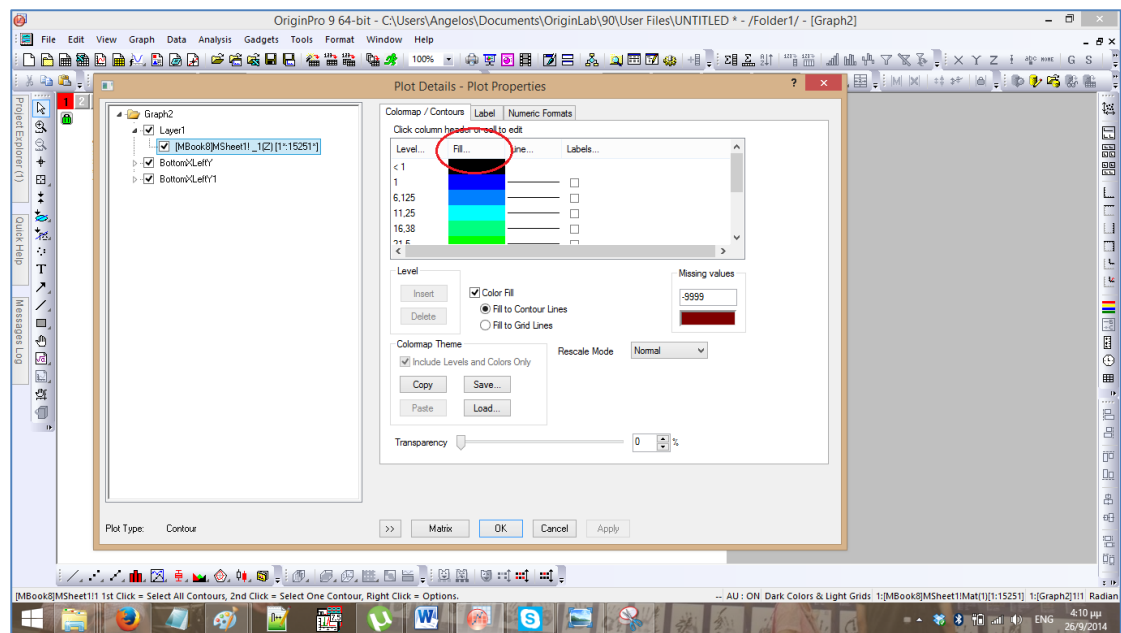


Figure 16

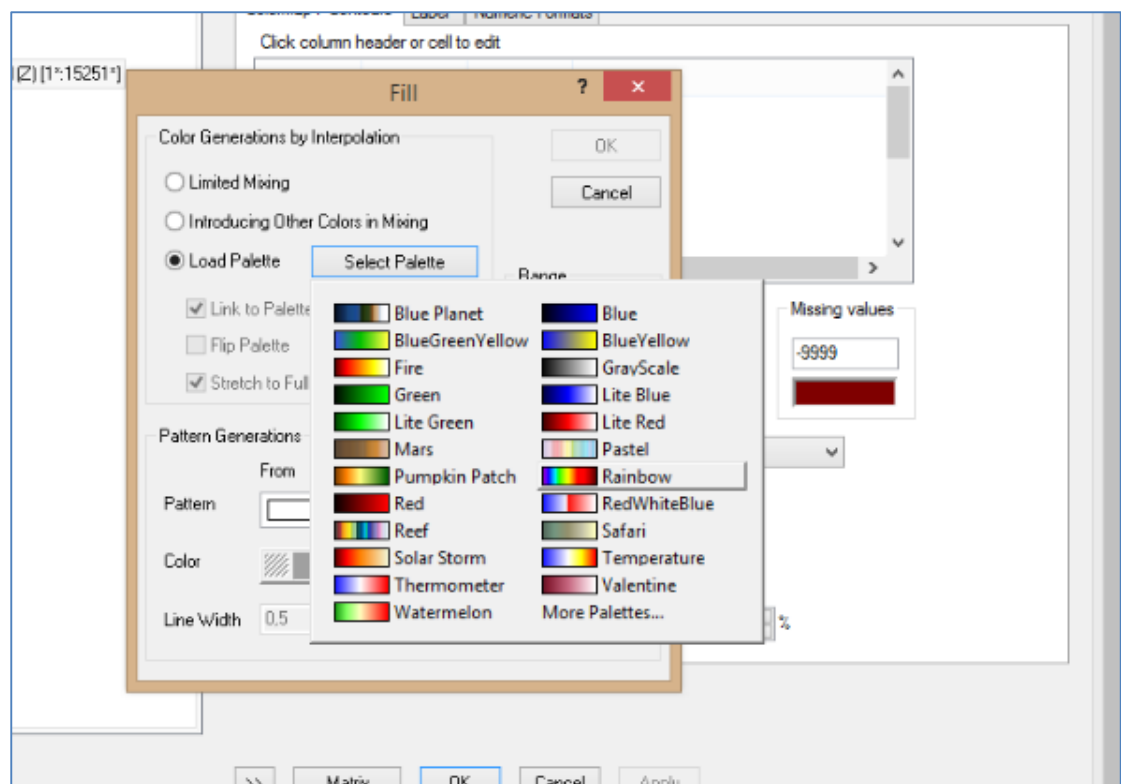
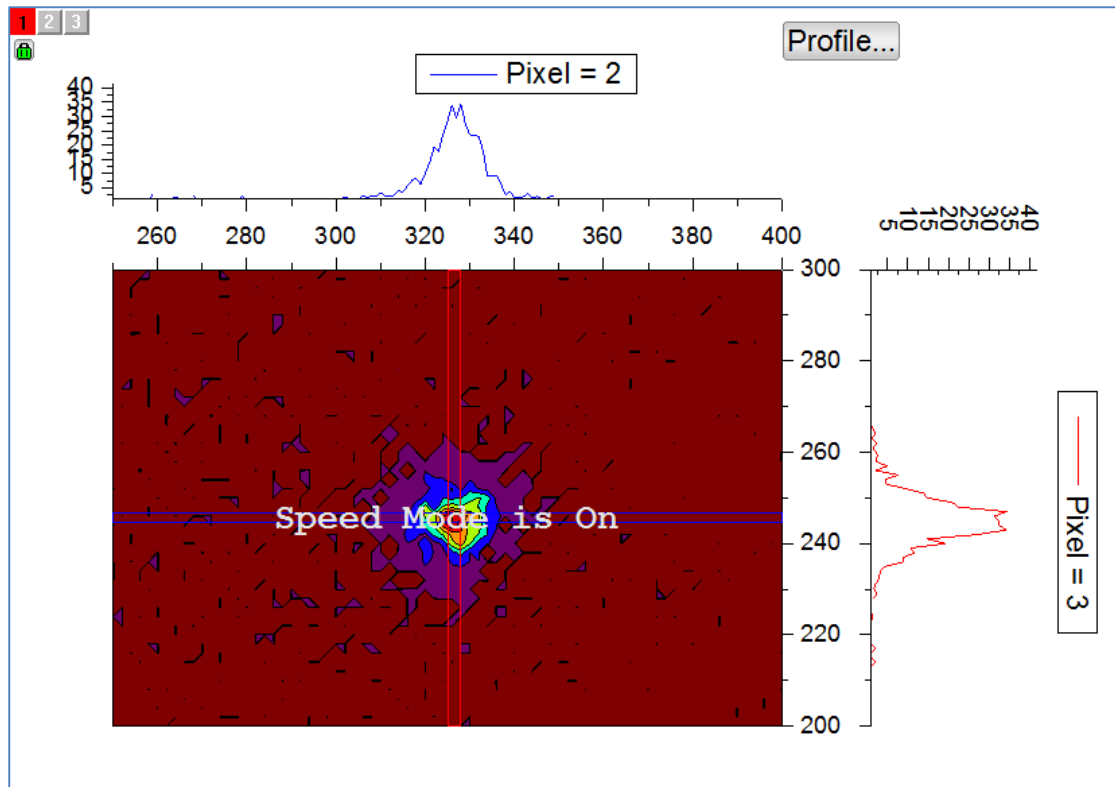
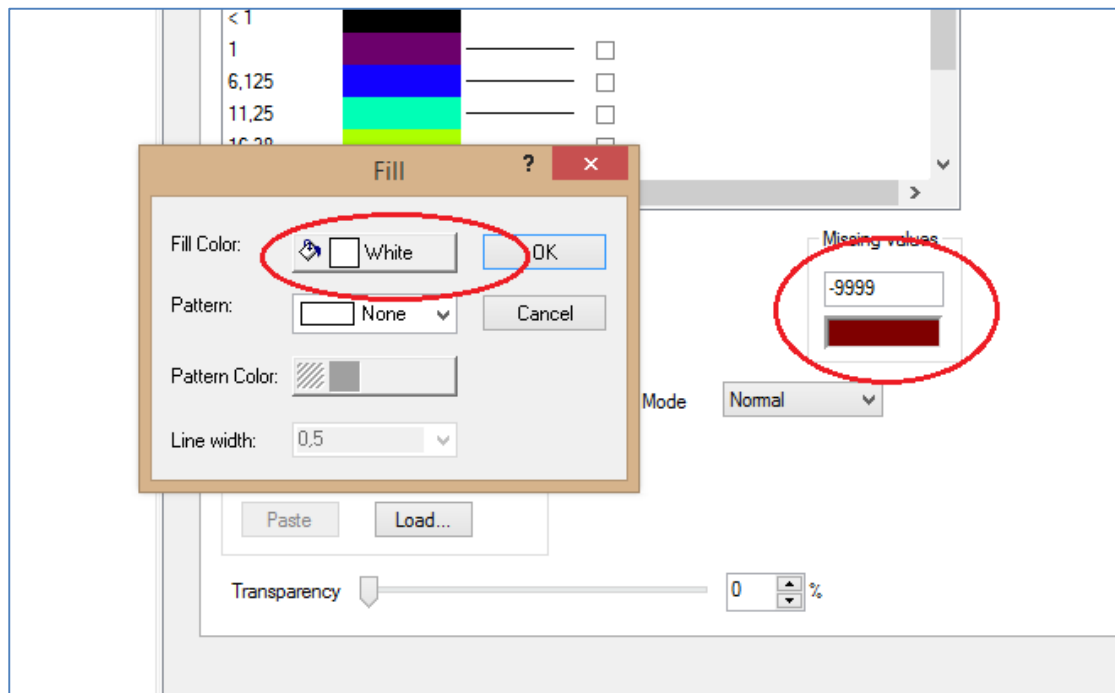


Figure 17

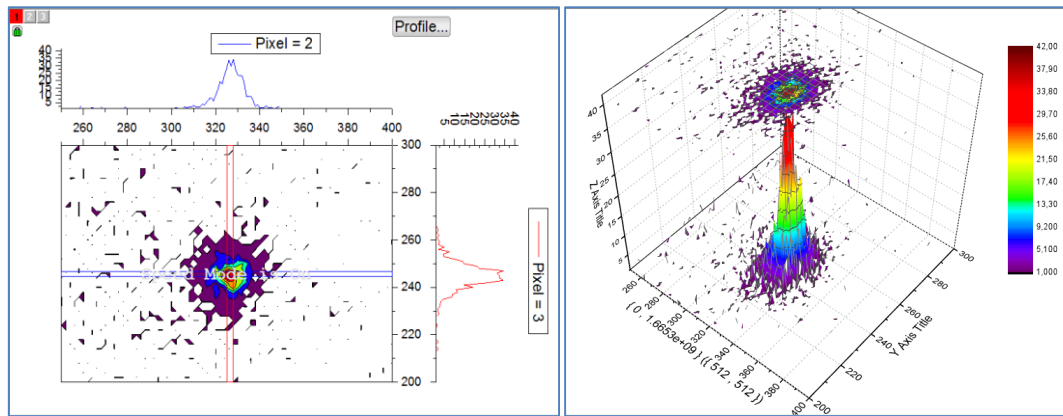


**Figure 18:** The colormap of the Contour plot changed in order to match the Colormap Surface with Projections plot.

We can also change the Missing values color. In this example it was changed from black, to white, in order to match the **Colormap Surface with Projection** plot, as shown in **Figure 19 and 20**.



**Figure 19**



**Figure 20**