

# Using IDL for more advanced Plotting

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## Introduction

This is a second tutorial on using [IDL](#), at [PPPL](#). If you have not used IDL for more than a few hours, you should work through the examples in the [IDL Introduction](#)

This tutorial is organized as a set of examples with **limited** explanation. The most effective way for you to go through this tutorial is by running IDL in a separate window, and trying out the commands and programs as you read the tutorial. For maximum benefit, you should save copies of the programs in a personal directory, and experiment with changing them.

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## Getting started

You need to know about [How to Setup IDL at PPPL](#). This will tell you on which machines IDL is running, how to set up your environment, how to set your display, and how to find documentation.

Recall that IDL programs can be stopped using control-C. (Hold down the control key and hit the letter c). IDL can be aborted immediately using control-\. (All variables are lost and the state of open files will be uncertain). On VMS you may have to hit control-Y if this does not work.

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## Create Plots with Color lines and Legends

This simple program shows you how to go beyond the one-plot-per-page method.

```
pro demolegend

; demolegend.pro
;
; this file demonstrates the use of the Legend routine in multiplots

!p.multi=[0,1,2]

meanings = ['good stuff', 'better stuff', 'best stuff']
psyms = [-1,-2,-4]
colors = [MK_COLOR('red'),MK_COLOR('yellow'),MK_COLOR('blue')]
lines = [1,2,4]

x=FINDGEN(11)

FOR nplots=0,1 DO BEGIN

    PLOT,x,x^1.3,/nodata
    for i=0,2 do OPLOTT, x, x^(1.1+(i/10.)), psym=psyms[i],    $
        color=colors[i], linestyle=lines[i]
    LEGEND, meanings, /right, /top, psym=psyms,    $
        color=colors, linestyle=lines

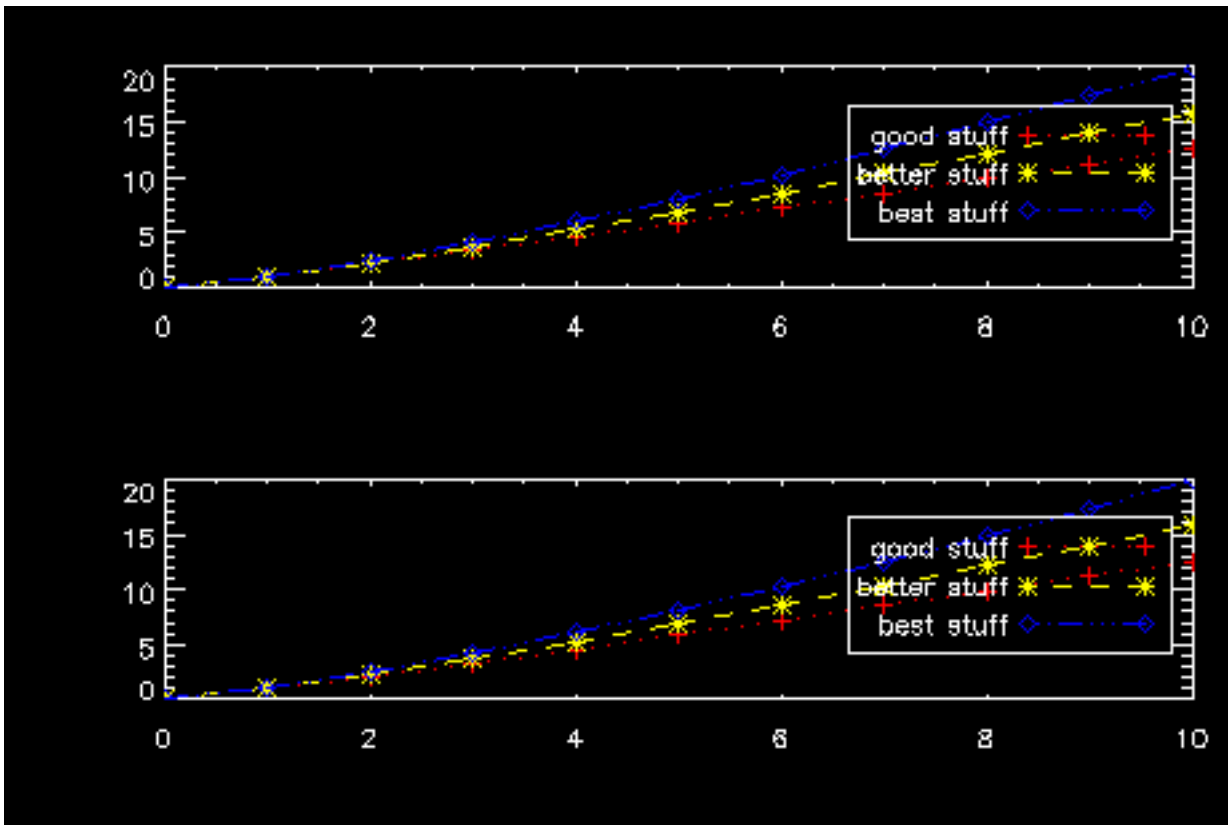
ENDFOR
!p.multi=[0,1,1]

return
end
```

Type the following at the IDL prompt

```
IDL> demolegend
```

This will execute the commands above (if the directory containing demolegend is in your IDL "path".)



As an excersize, try modifying the above code to place the legend on the left instead of on the right (use the /left keyword in the LEGEND call, rather than /right).

To examine the source of any user-written routines used in these examples, locate it with doc\_library. If the author followed the IDL convention for documenting the source, you will also see that displayed. For example, to find out where mk\_color.pro is located, type:

```
IDL> doc_library,'mk_color'
```

---

## Simple MDS Access

(On VMS, you will have had to do this in DCL:

```
$ setup mdsplus  
$ setup nstx
```

)

```
IF (!VERSION.OS NE 'vms') THEN MDSCONNECT, 'birch:8501'  
MDSOPEN, 'nstx', 89725  
signal = '.waveforms:mb_ip_sl'
```

```
f = MDSVALUE( signal )  
time = MDSUNITS( signal, /TIME )  
flabel = MDSUNITS( signal, /UNITS )  
timelabel = MDSUNITS( signal, /TIME, /UNITS )  
  
PLOT, time, f/1000., XTITLE = timelabel, YTITLE = 'milli'+flabel
```

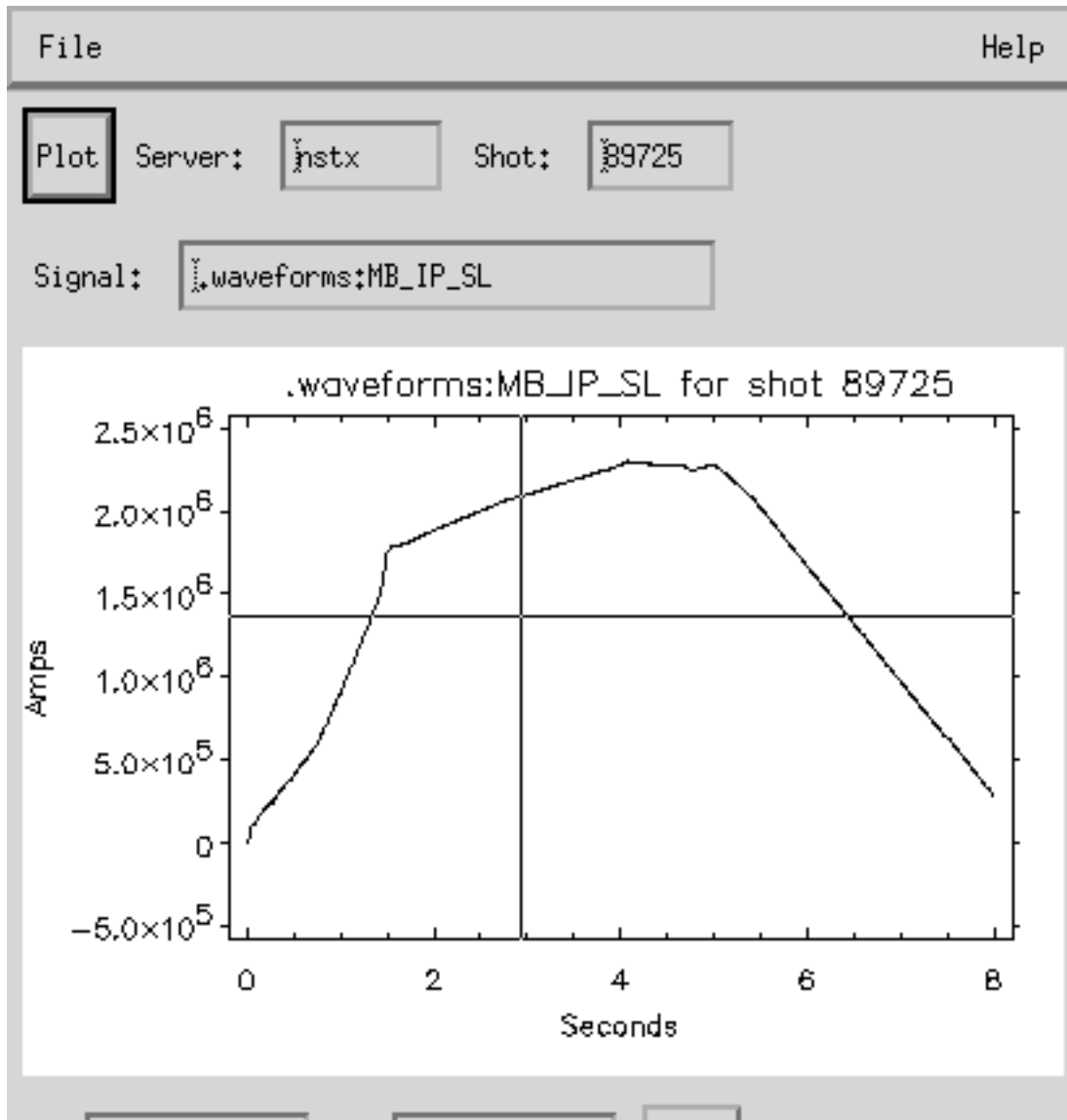
For more examples of MDSplus access at PPPL, see  
<http://NSTX.pppl.gov/nstx/Software/IDL/mdsaccess.html>.

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## An MDS Plotter Widget

If your are running x-windows, type the following at the IDL prompt:

```
IDL> mds
```





Some of the above "widgets" are buttons that you click on to initiate actions (like making a plot or sending the plot to the printer), others are fields you can type in (like signal) and the field containing the small rectangle on the right is a pull-down menu. You can rescale the plot by placing the mouse pointer over the plot, holding down the middle mouse button, dragging, and releasing. The x- and y-positions of the cross-hairs are shown in the small boxes at the bottom of the plot.

To find where this source for mdsplus is located on your computer, type:

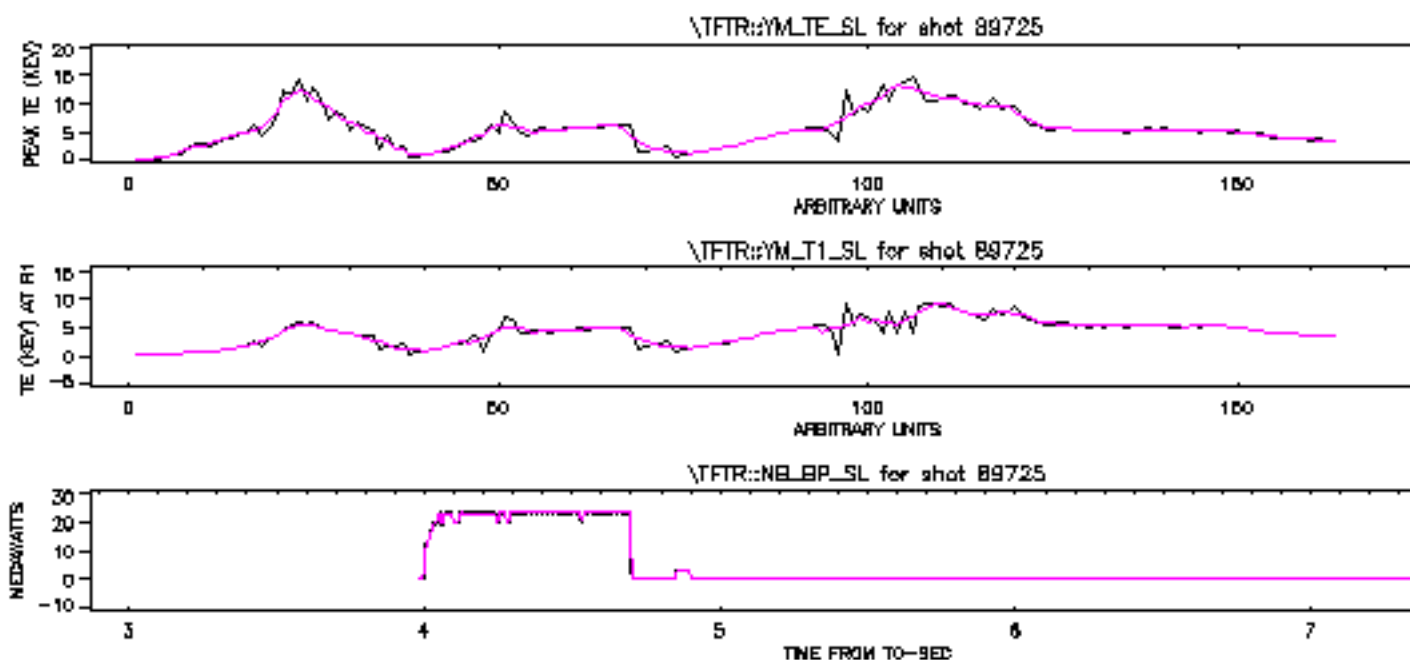
```
IDL> doc_library, 'mdsw'
```

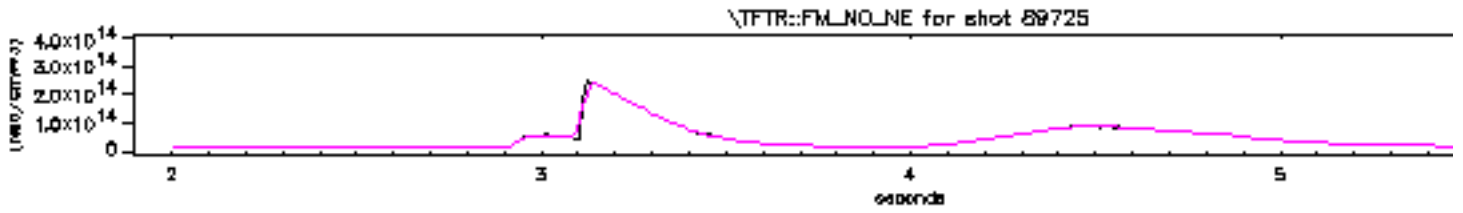
You should probably look at [mdsw\\_noch.pro](#). It is simpler and illustrates most of the important concepts.

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## Plot Stacks of MDSplus Signals

This is a more elaborate MDSplus plotting widget that you can customize. If you have a list of MDSplus signal names in a file named mdsplussig.txt in the directory from which you are running IDL, they will be plotted when you click on "My Signals." Look at the code for stackplot.pro on the PPPL Unix Cluster or on VMS.





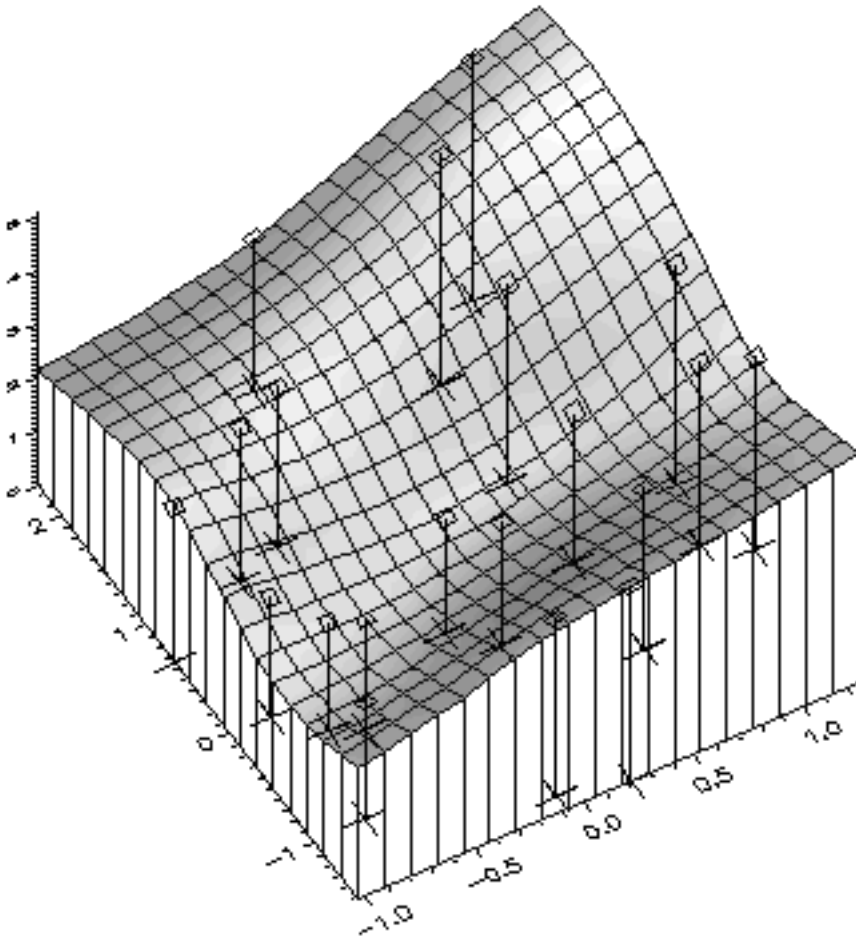
Server: <input type="text" value="tftr"/> Shot: <input type="text" value="89725"/>	<input type="button" value="My Signals"/>	<input type="button" value="Random Time-Series"/>
<input type="text" value="5"/>	<input type="button" value="Magnetics Data"/>	<input type="button" value="Info..."/>
Smoothing Factor	<input type="button" value="Misc Data"/>	

## Combined Surface Plotting

Type the following at the IDL prompt

```
IDL> vectorsurf
```

This will execute the commands in the file [vectorsurf.pro](#).



Some aspects of this routine are fairly complicated, but may be useful as it stands.

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## How to find out more about IDL.

There is an excellent **demo** supplied with idl, which shows many of the advanced things IDL can do. Just type "demo" at the IDL prompt.

You may also want to look at the IDL supplied examples in **/usr/local/rsi/idl/examples** on Unix or `IDL_DIR:[EXAMPLES]` on VMS.

You should also visit these [valuable IDL sites](#), especially the ones that let you search for IDL routines written by others (no such search exists for fusion, or PPPL-specific software, but it should).

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[Return to the NSTX Software Page](#)

***[http://nstx.pppl.gov/nstx/Software/IDL/idl\\_class2.html](http://nstx.pppl.gov/nstx/Software/IDL/idl_class2.html)***

***Edited for NSTX: 03-Feb-1999***

***by: [Bill Davis](#)***

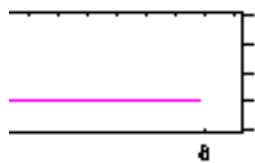
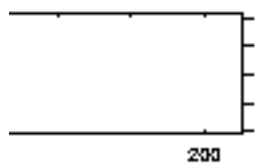


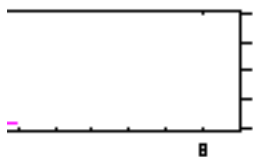












A vertical rectangular control panel with a thin black border. It contains two rectangular buttons stacked vertically. The top button is labeled "Break" and the bottom button is labeled "Exit".



