

# python data plotting

## an introduction

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# Introduction

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there are  $n$  different ways to analyse data, where  $n$  is an enormous unsigned int.

It is not important which of the  $n$  ways you use, what matters is that the final result is correct.

# Some Software



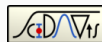
Matlab



Excel



Origin



Scidavis

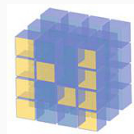
# What you will see today



Python



Matplotlib



Numpy

## Experimental data

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The data that we will use to plot is stored into an **ASCII** file. -> ir.001



## Data for the first plot

```
SMPL: Zona=1 Blocchi=128
1.00000 -21883.715
1.05870 -21842.303
1.12084 -21925.125
1.18664 -21646.545
1.25629 -21736.895
1.33004 -21413.137
1.40811 -21537.369
1.49076 -21559.959
1.57827 -21401.844
...
```

This is the format of the data stored in the **first ASCII** file that we will use.

A **second plot** will be extracted from another file, we will keep that as an exercise for the second part of the lecture.

# Python

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**Python** is an interpreted language, that has legibility and code condensation as it's main features.

On Gnu/Linux systems python is installed by default. Anyhow it doesn't come with the plotting and data handling packages. In python these are called modules, we will use: ***matplotlib, scipy and numpy.***

To install and manage those modules I suggest using **pip** which is a python module manager, which can be installed by:

```
$ sudo apt-get install python-pip  
$ sudo pip install --upgrade pip
```

The modules that we need are the ones to: read and manage data (numpy) and to plot (matplotlib). To install these modules it is sufficient to:

```
$ sudo pip install numpy scipy matplotlib
```

## Other ways to install/use python

**online** -> azure notebook : <https://notebooks.azure.com/> which needs a microsoft office account ( usually university/institutions give these accounts for free)

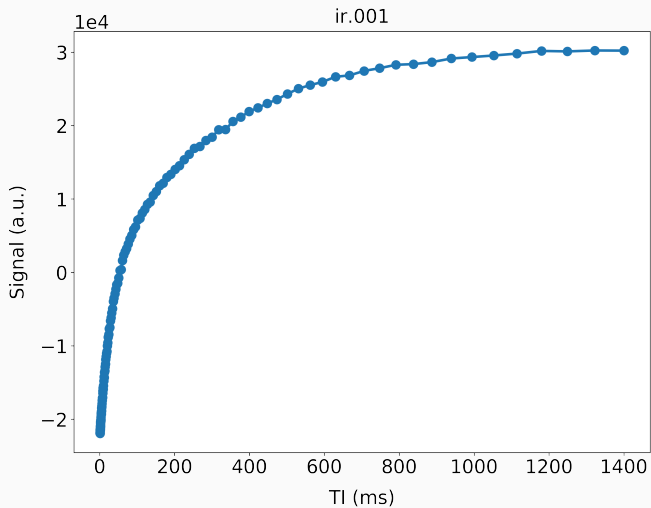
**windows/mac** -> anaconda with python > 3.7 :  
<https://www.anaconda.com/distribution/>

In the next few slides some python code will be shown. For the ones familiar to C/C++, should be easy to read.

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 data = np.loadtxt("ir.001", skiprows=1)
5
6 x = data[:,0]
7 y = data[:,1]
8
9 plt.subplots(1,1,figsize=(12, 9), dpi=300)
10 plt.title("ir.001")
11 plt.plot(x,y,marker="o")
12 plt.ylabel("Signal (a.u.)")
13 plt.xlabel("TI (ms)")
14 plt.ticklabel_format(axis='y', style='sci', scilimits=(0,3))
15 plt.show()
```



# Result



Let's see it in Jupyter

## Exercise

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For the second plot, you will use the data stored in **irA.dat**.

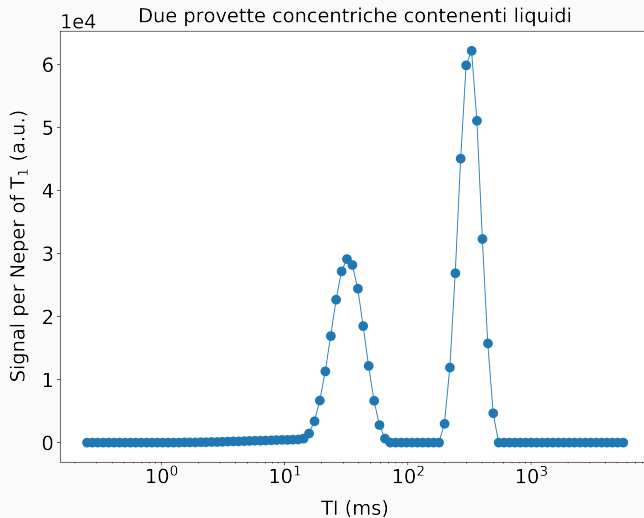
To read the data from this file, you will need to use the numpy function **np.genfromtxt**. The following parameters will be useful:

- delimiter
- skip\_header
- usecols
- skip\_footer

The x-axis should be plotted in logarithmic scale: **xscale("log")**.

To save the image: **savefig('MyIncrediblePictureName.png')**

# Result



Questions ?