

## This program shows how to make plots for PHYS 251: Atomic Physics Lab

```
# import Python's standard data analysis libraries
import numpy as np
import matplotlib.pyplot as plt

# Data to be plotted
x_data=np.array([0, 1, 2, 3, 4])           # time in seconds
y_data=np.array([2.1, 2.9, 4, 5.1, 5.8])  # Y-position in cm

x_errorbars=np.array([0.2, 0.2, 0.3, 0.2, 0.2]) # Error on x_data
y_errorbars=np.array([0.2, 0.3, 0.2, 0.5, 1.1]) # Error on y_data

# Generate the plot
plt.plot(x_data, y_data, 'blue', linestyle='none', marker='o', markerfacecolor='blue', markersize=10) # make the plot with round markers
plt.title('Basic plot', fontsize=15) # Add the plot title

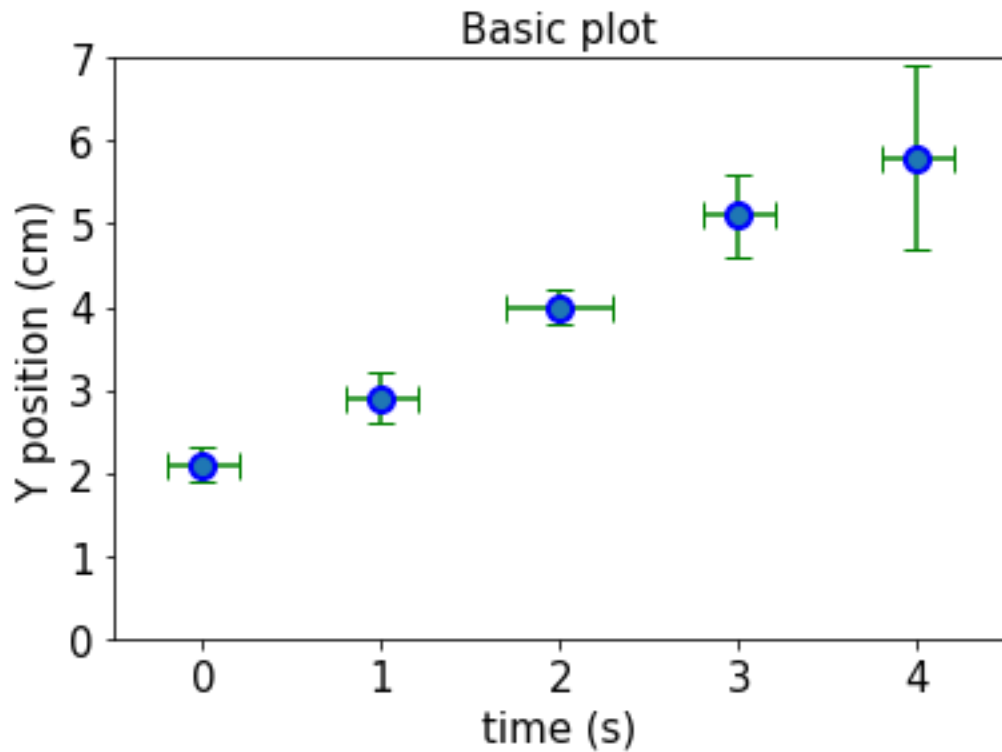
plt.ylabel('Y position (cm)', fontsize=15) # Add the y-axis label, "fontsize" is optional
plt.yticks(size=15) # adjust the size of the y-axis tick number labels

plt.xlabel('time (s)', fontsize=15) # Add the x-axis label, "fontsize" is optional
plt.xticks(size=15) # adjust the size of the x-axis tick number labels

# Set the range of the plot axes
plt.xlim(-0.5, 4.5) # Set the range of the plot's x-axis
plt.ylim(0.0, 7.0) # Set the range of the plot's y-axis

# Add error bars
plt.errorbar(x_data, y_data, y_errorbars, x_errorbars, fmt='o', ecolor='green', capsize=5) # Note: y_errorbars comes before x_errorbars

# Assign a name to the plot figure, i.e. "1" stored in figure handle "fig1"
fig1=plt.figure(1)
```



### Saving the plot to your computer

Once you are satisfied with the plot quality (i.e. data, format, etc), then you can save it and download it to your computer

```
# Save the plot to your computer
from google.colab import files                                     # Import the library for loading/saving files to/from Google Colab environment.

figure_filename='Python_plot_test_v7.pdf'                       # String variable that contains the filename, including the extension.
fig1.savefig(figure_filename,bbox_inches='tight')               # Saves the fig1 figure to the Google Colab environment. Extension defines file format.
files.download(figure_filename)                                 # Download the file "figure_filename" from the Google colab environment to your computer.
```