Modelling Nonlinear optics with the Bloch-Messiah reduction

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Why you should use version control

- What is nonlinear optics?
- Why do we care about it?
-

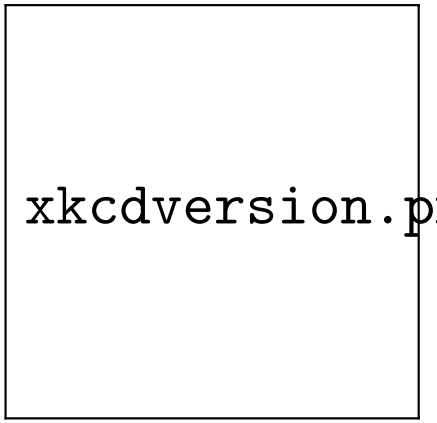

Figure: Integrated optical chip with 16 single photon sources

What is Git?

- Git is one of most used version control software in the world
- Git is cross-platform and easy to use [1].

[2] https://try.github.io/levels/1/challenges/1

What is GitHub?

- Github is a cloud service for git which lets you store your repository online
- Why would you store your repository online?
  - Working remotely
  - Collaborative work
  - Hard drive failure!

Making a repository

- You can do this online on the Github website [2]
- Create a new repository
- Then click clone to get the url, open git on your computer and type:
  `git clone url`

[3] https://github.com/

Making a repository

- Go to the folder and right click `git with bash`
- You are now able to use bash for the rest of the talk!

Basic Git commands

- There are four[3] important commands you will need for git:
- `git pull`
- `git add *`
- `git commit -a`
- `git push`

[1] I cheat here and write a bash script which does these in order so I only have to run a single command.

Advanced Git commands

- One of the great things about Git is that you can get by with just the four above commands.
- The git man page is very useful, especially,
  `man gittutorial`
  `man giteveryday`
- `giteveryday` is a super useful collection of the 20 commands you will need regularly.

Adding Collaborators

- Go to a repository and on the settings tab click collaborators, you can then search for the github username

Why Python?

- Python is popular, multi-platform and becoming a standard language[4]
- It is a good high level language to know, it is a very flexible interpreted language.

[2]standard on most of the popular linux distributions

Python syntax

- As with every programming language we should figure out how to do *Hello, world!*

Open python and type:

```
print 'Hello, world!'
```

- As Python is an interpreted language you can run command by command in python or use an IDE and then use python to run the program. For plotting it is more useful to write the program out in an IDE first.

Adding your first commit

- Save your *hello, world!* program.
- Then either run:
- `git add *`
- `git commit -a`
- `git push`

Or use the windows GUI version and commit them to your repository.

Plotting

- Python requires the `numpy` library[5] for a lot of basic maths functions (and arrays).
- We are going to use the `matplotlib` library[6] for the remainder of this talk.

[3] http://www.numpy.org/

[4] https://matplotlib.org/api/_as_gen/matplotlib.pyplot.plot.html

Example 1, Plotting functions

- Go to the `src` folder and open `ex1functions.py`
- Run `all.py` and choose 1

Example 1, Plotting functions

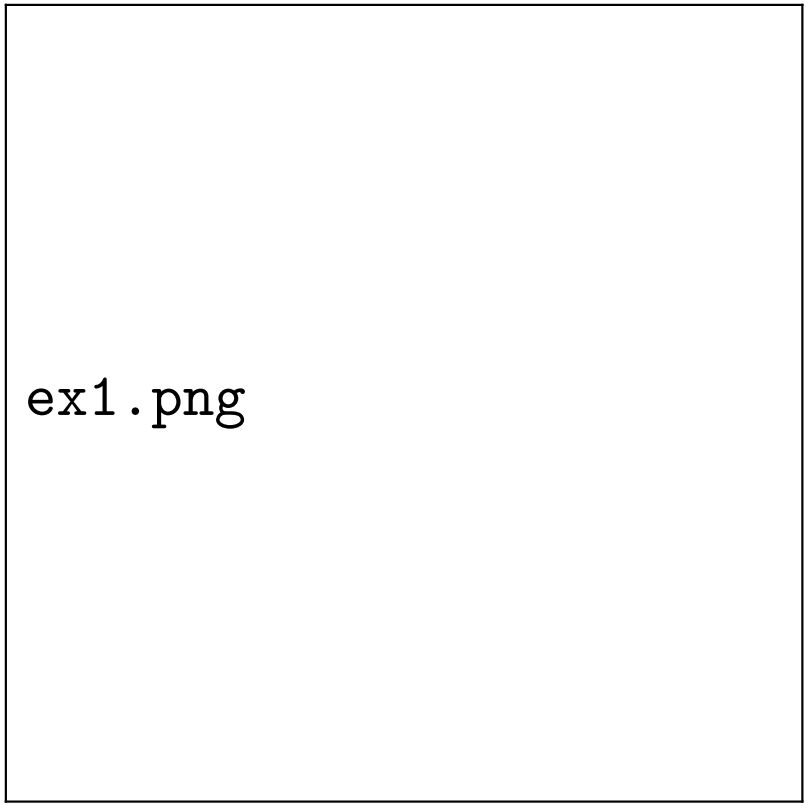

Figure: function plotting

- It could do with some axis labels.
- go into the program and find the line called `plt.ylabel=` and `plt.xlabel=`

Example 2, Complicated functions!

- In the `src` folder open `ex2compfunctions.py`
- Run all.py and choose 2

Example 2, Complicated functions!

- Figures!
-

aex2.png

Figure: function plotting

Example 3, Plotting data!

- once again, in the `src` folder open `ex3data.py`
- Run all.py and choose 3

Example 3, Plotting data!

- figure

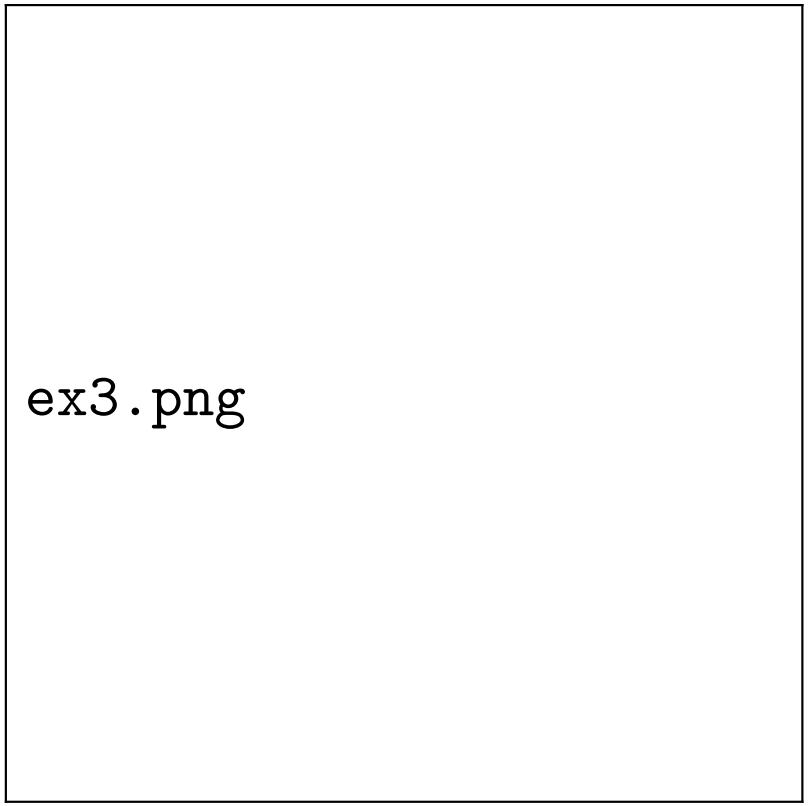

Figure: function plotting

Example 4, Histograms!

- once again, in the `src` folder open `ex4hist.py`
- Run all.py and choose 4

Example 4, Histograms!

- figure

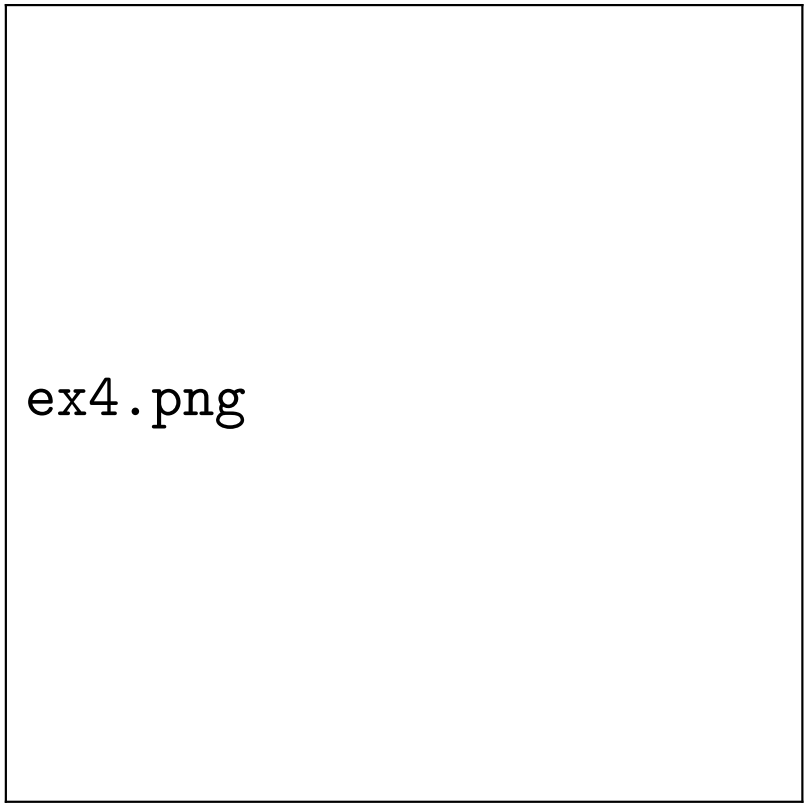

Figure: function plotting

Example 5, Subplots!

- In the `src` folder open `ex5subplots.py`
- Run all.py and choose 5

Example 5, Subplots!

- Figures!

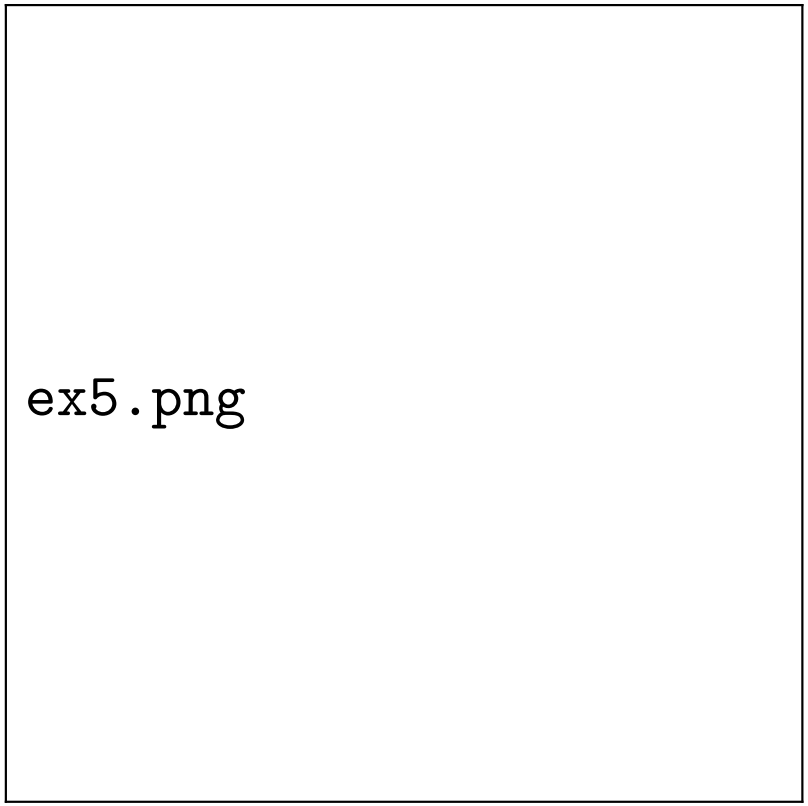

Figure: function plotting

Example 6, Art!

- In the `src` folder open `ex6art.py`
- Run all.py and choose 6

Example 6, Art!

- Figures!

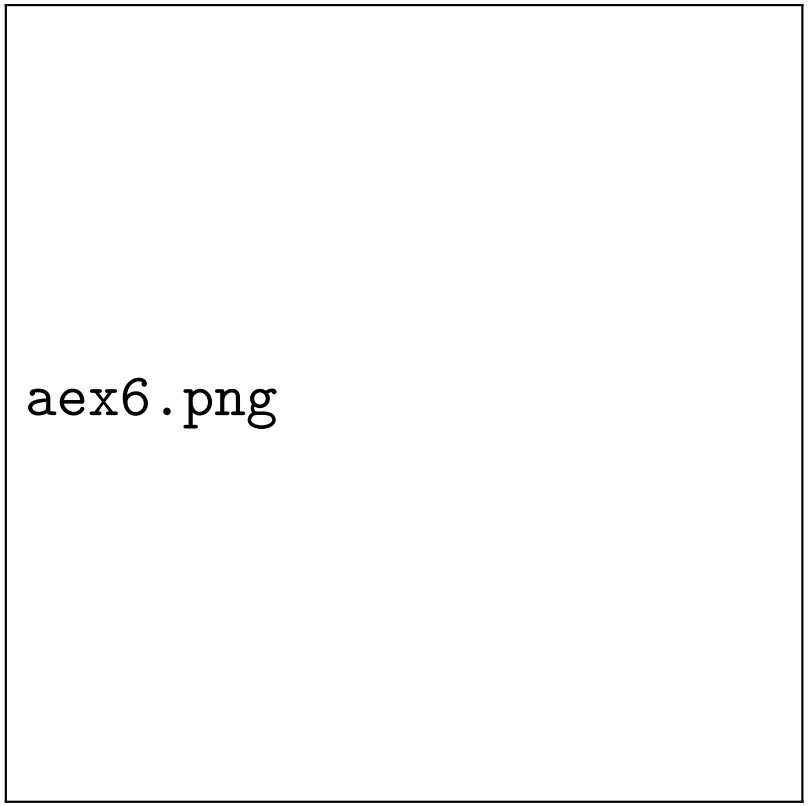

Figure: function plotting

Branching

- Branching is useful, it lets you test something out separately to the main branch.
- To make a new branch called `test`
  `git branch test`
- You can check all of the current branches and which branch you are on with
  `git branch`

Branching

- To switch to the test branch type:
  `git checkout test`

Thanks for listening!

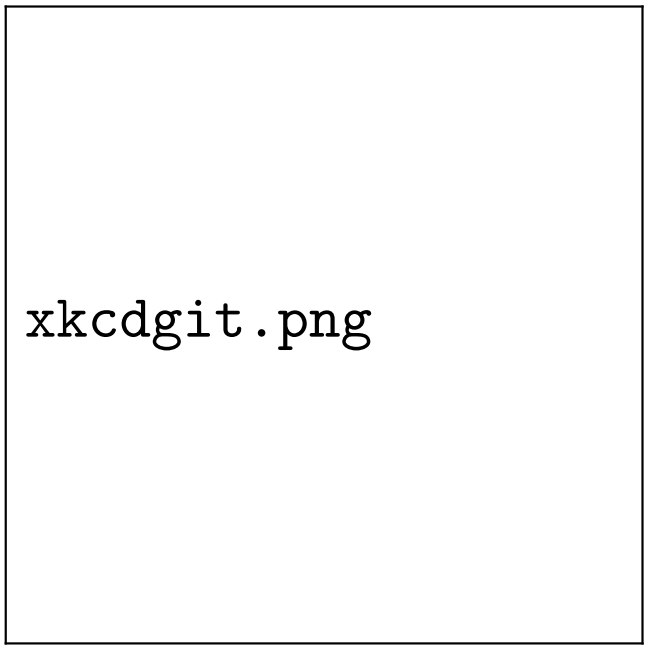

Figure: If it all goes wrong . . . [7]

[1] https://xkcd.com/1597/