

DRAWING TOOL: XFIG

1. Xfig Intro

I will guide you through the following main commands of xfig, which is a drawing tool to make figures or sketches (examples: Ising model lattice, sketch of experimental setup, sketch of galaxy):

- **To get started:** Type on the command line: `xfig &`
This will open a new window. (or in case you plan to use latex-commands please see below (1) of “Advanced xfig Users”)
- **drawing tools:** background grid, circle, line, text, rotation & symmetry flip, picture, grouping, scaling, copying, editing.
- **To save an xfig session** use File → SaveAs and give your xfig-file a name ending with `.fig`. You can get back to this session any time on the command line with `xfig filename.fig &` or within xfig with File → Open.
- **To make an eps-file** out of your figure use File → Export, make sure to choose “EPS (Encapsulated Postscript)” and choose the same filename but with the ending `.eps`. This eps-file can then be included in your latex file for the paper. To have a placeholder for the filename you used, in the following I use `filename`, so you would save `filename.eps` meaning e.g. `experimentalsketch.eps`.
- **To look at the eps-file**, i.e. to check that the figure looks as intended, type on the command line `evince filename.eps` (so for given example you would type `evince experimentalsketch.eps`)
- **For Advanced xfig Users:** In case you would like to use latex commands within xfig use the following steps: First copy two files from our phys310-linux account
`scp phys310@linux.bucknell.edu:XfigXmgrace/xfig2eps .`
`scp phys310@linux.bucknell.edu:XfigXmgrace/xfig2pdf .`
 (Don't forget the period, which copies the file into your working directory; I will remind you of the password in class)
 then make both executable (these are perl-scripts)
`chmod u+x xfig2*`. These `xfig2*` files will be needed for step (3) below.

Instead of xfig use instead

(1) `xfig -specialtext -latexfonts -startlatexFont default`

(2) first save then export to “Combined PS/LaTeX (both parts).”

This creates two files: `filename.pstex` and `filename.pstex.t`. To then make an eps-file (which you can include in your paper)

(3a) `xfig2eps filename`

or to make a pdf-file use

(3b) `xfig2pdf filename`

2. Start working on a figure for your first paper.

- Ben, JD, Kate, Zach: Work on a sketch of the Ising model lattice with spins and highlight one of the spins and its four neighbors; You could also work on a figure for the Metropolis algorithm, if so, I recommend to use the advanced xfig.
- Pete, Julia R., Jonathan, Rajasri: You could work on a sketch of the galaxy with the center, Earth, and cloud with velocity.
- Houtan, Ryan, Michael, Ziqi: You might work on a sketch for the Sodium transition, and maybe sketches for the photoelectric effect etc.
- Eddie, Julia B.: You could make a sketch of the experimental apparatus, indicating the different relevant lengths and sketching the light rays to explain the necessity of the additional plate.

PLOTTING GRAPHS: XMGRACE

1. xmgrace Introduction:

The following tool, xmgrace, is for making graphs of data and functions. To have some data files use the following copy commands:

```
scp phys310@linux.bucknell.edu:XfigXmgrace/TME.data .
scp phys310@linux.bucknell.edu:XfigXmgrace/fsqt5000to2500_q17_0ns.data .
scp phys310@linux.bucknell.edu:XfigXmgrace/fsqt5000to2500_q17_16ns.data .
scp phys310@linux.bucknell.edu:XfigXmgrace/tau_2500from5000_q17.data .
scp phys310@linux.bucknell.edu:XfigXmgrace/tau_3000from5000_q17.data .
```

and to have a sample xmgrace file:

```
scp phys310@linux.bucknell.edu:XfigXmgrace/fsqt.xmgr .
```

- To get started with xmgrace type on the command line `xmgrace &`.
- To import a dataset use Data → Import → ASCII and under Selection add `tau_2500from5000_q17.data` then click OK. Similarly pull in the dataset `tau_3000from5000_q17.data` . (An alternative would have been to type in the command line instead of `xmgrace &` the command `xmgrace tau* &`)
To import data with error bars, use Data → Import → ASCII and for LoadAs choose Blockdata and for DataType choose xydy under Selection add `tau_2500from5000_q17` then click OK and choose the columns of the data file which you would like to use.
Alternative: use in the command line `xmgrace -type xydy tau* &`
- **Symbol Settings:** I will show you, how to change: labels for data, symbols, line symbols
- a few useful fonts:

– $\{1\}$ switches to italics

- `\f{0}` switches to roman
- `\S` switches to superscript
- `\N` switches back to default (nont superscript)
- `\s` switches to subscript
- `\x` switches to symbols, e.g. `\xa` gives you α
- **Axis Settings:** I will show you, how to change x-range and y-range, line width, label incl. size, tick marks, logarithmic axis
Alternative: use in the command line `xmgrace -log xy tau* &`
- **Legend Settings:** I will show you, how to change its positions and size.
- To save an `xmgrace` session use File $\rightarrow$ SaveAs (use a filename which ends with `.xmgr`). It is important to use SaveAs the first time because default is to overwrite your data-file! For the second time saving you may use Save. To continue a previously saved `xmgrace` session use File $\rightarrow$ Open.
- To make an **eps-file** use File $\rightarrow$ Print setup and choose as device EPS. This only sets up the printing, to get the eps-file printed use File $\rightarrow$ Print.
- To plot a **mathematical function** Edit $\rightarrow$ Data sets $\rightarrow$ right-click on the clear area $\rightarrow$ create new $\rightarrow$ By formula. Then choose the xrange with Start at, Stop at and Length (number of points) and type in the formula, e.g. `x=$t` (that's default) and e.g. for `y=3.4*$t^2`, and then Accept or Apply.
- You may also want to play some with the example `fsqt.xmgr` .

2. For your first paper make a figure which would satisfy the expectations on figures for scientific publications. Make an eps-file and include it in your latex file from last class.

PLOTING PART OF SCREEN

To make an eps-file of any part of your screen use on the command line

```
import picturefilename.eps
```

and use the left mouse button to pick the area (drag & let go). This will create the file `picturefilename.eps`.

SCIENTIFIC LITERATURE SEARCH

You will learn more about how to find scientific papers on March 29. I will introduce then Web of Science. You find a link to this search tool on our phys 310 webpage <http://www.eg.bucknell.edu/physics/ph310/> under Literature Search Tools.