

# Tutorial

## How to create the SPHIRE tutorial

1. Create a word docx document out of the latest .gfm version stored in the versions folder:  
**make latest\_to\_docx**  
This will create a new **tutorial\_`\${time\_stemp}`.docx**.
2. Edit the file following the rules listed below.
3. Rename the edited file to **tutorial.docx**.
4. Check if you did not do any mistakes in the syntax:  
**make check\_docx**  
This will create a new file **tutorial\_check.gfm**, that can be used to check the occuring errors.  
It also can also be used to create a diff with the .gfm file used in step 1.
5. Fix occuring errors and repeat step 4.  
The errors:  
(‘|||URLEND|||>’, ‘not found’)  
(‘|||URL|||<’, ‘not found’)  
(‘>|||URLEND|||’, ‘not found’)  
Can be ignored.
6. Build the PDF  
**make clean**  
**make**  
This will create the **build** folder and after the program finished, please check the **build/tutorial.log** file for more advanced errors.
7. Fix the last errors and after no errors occure (*Latexmk: All targets (./build/tutorial.pdf) are up-to-date* in log.txt), distribute the PDF

## How to create this tutorial

1. Edit README.md in **git flavoured markdown** syntax:
  - **Bold** - **\*\*Bold\*\***
  - *italic* - **\*italic\***
  - ***Bolditalic*** - **\*\*\*italic\*\*\***
  - **\_** need to be replaced by **\\_**
2. Build the pdf  
**make readme**

## Installation

1. Download and install pandoc:  
<https://pandoc.org/>
2. Download and install TeX:  
Linux: <https://www.tug.org/texlive/>  
Mac: <https://www.tug.org/mactex/>
3. Run a python 2.7 environment while compiling the tutorial

## How to edit the tutorial

### Format

- There are 4 format options available:
  - Tags
  - ***Bolditalic***
  - **Bold**
  - *italic*
- Tags - For postprocessing `|||TAG|||`; some tags require `|||TAG||| text |||TAGEND|||`.
- ***Bolditalic*** - Used for button names and inline terminal commands.
- **Bold** - Used for file names, directory names, GUI labels and to highlight other texts.
- *italic* - Used for file extensions.
- All other formattings should be avoided.

### Tags

Listed are just the ones for editing existing chapters/sections.

In case you want to see all possibilities checkout `scripts/gfm_to_latex_tags.txt`.

### Inline

- `|||NEWLINE|||`  
Put this one between paragraphs.
- `|||SI|||number unit unit|||SIEND|||`  
Put this around numbers that have a unit, e.g. `|||SI|||1.14 1 per pixel per angstrom^2|||SIEND|||`.
- `|||UNIT|||unit unit|||UNITEND|||`  
Put this around a unit , e.g. `|||UNIT|||1 per pixel per angstrom^2|||UNITEND|||`.

- `|||URL|||url|||URLEND|||`  
Put this around numbers that have a unit, e.g. `|||URL|||https://...|||URLEND|||`.
- `|||WIKI|||`  
Put this to insert a link to the SPHIRE wiki
- `|||REDNUM||| text |||REDNUMEND|||`  
Color text red
- `|||PURPLENUM||| text |||PURPLENUMEND|||`  
Color text purple

### Environments

- `|||ISSUE|||{Issue header} text |||ISSUEEND|||`  
Start an issue section
- `|||ADVANCED|||{Advanced header} text |||ADVANCEDEND|||`  
Start an Advanced section
- `|||EQUATION|||Equation in TeX syntax|||EQUATIONEND|||`  
Put this for nice formatted equations.
- `|||TIP||| text |||TIPEND|||`  
Tip section
- `|||NOTE||| text |||NOTEEND|||`  
Note section
- `|||IMPORTANT||| text |||IMPORTANTEND|||`  
Important section
- `|||TERMINAL||| text |||TERMINALEND|||`  
Terminal input section
- `|||STDOUT||| text |||STDOUTEND|||`  
Standard output/log file content section
- `|||CENTER||| text |||CENTEREND|||`  
Centered text

### Itemization

- `|||ITEMIZEDASH||| text |||ITEMIZEDASHEND|||`  
List with dashes as labelitem

- `|||ITEMIZEARROW||| text |||ITEMIZEARROWEND|||`  
List with arrows as labelitem
- `|||ITEMIZEGUI||| text |||ITEMIZEGUIEND|||`  
List with dots as labelitem
- `|||ENUMERATE||| text |||ENUMERATEEND|||`  
List with numbers as labelitem

### Inside Itemization

- `|||ITEM|||`  
Put this before items in an `|||ITEMIZEXXX|||` `|||ITEM||| text |||ITEMIZEXXXEND|||` and `|||ENUMERATE|||` `|||ITEM||| text |||ENUMERATEEND|||` environment.
- `|||ITEMTIP||| text |||ITEMTIPEND|||`  
Tip section in an `|||ITEMIZEXXX|||` `|||ITEM||| text |||ITEMIZEXXXEND|||` and `|||ENUMERATE|||` `|||ITEM||| text |||ENUMERATEEND|||` environment.
- `|||ITEMNOTE||| text |||ITEMNOTEEND|||`  
Note section in an `|||ITEMIZEXXX|||` `|||ITEM||| text |||ITEMIZEXXXEND|||` and `|||ENUMERATE|||` `|||ITEM||| text |||ENUMERATEEND|||` environment.
- `|||ITEMIMPORTANT||| text |||ITEMIMPORTANTEND|||`  
Important section in an `|||ITEMIZEXXX|||` `|||ITEM||| text |||ITEMIZEXXXEND|||` and `|||ENUMERATE|||` `|||ITEM||| text |||ENUMERATEEND|||` environment.

### Figures

- `|||FIGUREGUI|||figure_name|||FIGUREGUIEND|||`  
Large figure with a width of the page.
- `|||FIGUREMEDIUM|||figure_name|||FIGUREMEDIUMEND|||`  
Medium figure with a width of 70% of the page.
- `|||FIGURES SMALL|||figure_name|||FIGURES SMALLEND|||`  
Small figure with a width of 40% of the page.
- `|||FIGUREADV|||figure_name|||FIGUREADVEND|||`  
Figure used in a advanced or issue environment.

- `|||FIGURESUB|||figure_name_1|||FIGURESUBMIDDLE|||figure_name_2|||FIGURESUBEND|||`  
Two figures next to each other.
- `|||FIGUREMINI|||figure_name_1|||FIGUREMINIMIDDLE||| text |||FIGUREMINIEND|||`  
Figure and text on the same level.
- `|||FIGURECAP|||` Caption  
Start for an figure caption, e.g.  
`|||FIGURESUB|||figure_name_1|||FIGURECAP||| CAP1 |||FIGURESUBMIDDLE|||figure_name_2|||FIGURECAP|||CAP2|||FIGURESUBEND|||`

## Acronyms

- `|||ANOVA|||`  
analysis of variance
- `|||BDB|||`  
Berkley Data Bank
- `|||CRYO-EM|||`  
cryo-electron microscopy
- `|||CS|||`  
Spherical Aberration
- `|||CTF|||`  
Contrast Transfer Function
- `|||ELM|||`  
Electron Microscopy
- `|||FSC|||`  
Fourier shell correlation
- `|||GUI|||`  
graphical user interface
- `|||HDF|||`  
Hierarchical Data Format
- `|||ISAC|||`  
iterative stable alignment and clustering

- `||ML||`  
Maximum Likelihood
- `||MPI||`  
Message Passing Interface
- `||MTF||`  
modulation transfer function
- `||PDB||`  
protein data bank
- `||SD||`  
standard deviation
- `||SNR||`  
Signal to noise ratio
- `||SPANNA||`  
single particle analysis
- `||SPARX||`  
single particle analysis for resolution extension
- `||SPHIRE||`  
SParx for HIgh-REsolution electron microscopy
- `||XFEG||`  
X-Field Emission Gun
- `||SGE||`  
Sun Grid Engine

## Basic Latex

### Inside equation

- `\frac{numerator}{denominator}`
- `\text{Plain text}`
- `\times`
- `\approx`

### Outside equation

- `\parencite{citationname}`  
Name of the citation located in latex/TeX\_global/lit.bib.
- `\\`  
Force line break at this point.