

L^AT_EX

Editing Papers

Documents are written in plain text with **commands** that determine its structure

Text and commands are processed by LaTeX to produce neatly formatted documents

Extendable, numerous **packages** of extra commands and environments

LaTeX is now the de facto standard in academia!

- Philosophy: *You think about the content,
LaTeX takes care of the formatting*
- MS Word: *WYSIWYG – What You See Is What You Get*

Conference	Venue	% LaTeX
IPAC'24	Nashville	69%
IPAC'23	Venice	66%
IPAC'22	Bangkok	68%
FEL'24	Warsaw	67%
LINAC'24	Chicago	52%
HB'23	CERN	75%
FLS'23	Lucerne	66%
MEDSI'23	Beijing	9%

LaTeX usage within the JACoW community has increased from ~33% to ~67% over the past ~10 years

TeX Distributions:

MiKTeX, TeX Live (Windows, Linux, MacOS)

MacTeX (TeX Live distribution for MacOS)

Overleaf (online, ready to use) uses TeX Live

MiKTeX is the installation most used within JACoW Collaboration.

Advantage: easy installation process; automatically loads any missing packages

Current Windows version: 24.1

MiKTeX Console

File Tasks Help

Overview

Updates (123)

Documentation

Packages

Diagnose

Cleanup

Settings

miktex-lzm... 2023-05-06 (5.4.0) 2023-10-12 (5.4.0) install required
 miktex-lcdf... 2023-05-06 (2.1...) 2023-10-12 (2.1...) install required
 miktex-xml... 2023-05-06 (202...) 2023-10-12 (202...) install required
 luatex 2022-10-07 (2.75) 2023-08-21 (2.76) install optional
 miktex-chkt... 2023-05-06 (1.7.8) 2023-10-12 (1.7.8) install required
 miktex-mth... 2023-05-06 (23.5) 2023-10-12 (23...) install required
 miktex-yap-... 2023-05-06 (23.5) 2023-10-12 (23...) install required
 miktex-cjku... 2023-05-06 (4.8.4) 2023-10-12 (4.8.4) install required
 miktex-gd-... 2023-05-06 (2.3.3) 2023-10-12 (2.3.3) install required
 miktex-dvis... 2023-05-06 (3.0.4) 2023-10-12 (3.1.1) install required
 miktex-zlib-... 2023-05-06 (1.2...) 2023-10-12 (1.2...) install required
 miktex-urip... 2023-05-06 (0.9.7) 2023-10-12 (0.9.7) install required
 miktex-pix... 2023-05-06 (0.4...) 2023-10-12 (0.4...) install required
 miktex-log4... 2023-05-06 (0.1...) 2023-10-12 (1.1.0) install required
 miktex-met... 2023-05-06 (2.7...) 2023-10-12 (2.7...) install required
 amsmath 2022-06-13 (2.1...) 2023-06-17 (2.1...) install optional
 miktex-tex2... 2023-05-06 (1.24) 2023-10-12 (1.24) install required
 miktex-dvic... 2023-05-06 (1.6) 2023-10-12 (1.6) install required
 miktex-biba... 2023-05-06 (2.5) 2023-10-12 (2.5) install required
 ltxbase 2022-12-02 (202...) 2023-11-04 install optional
 miktex-zzip... 2023-05-06 (0.1...) 2023-10-12 (0.1...) install required
 miktex-fribi... 2023-05-06 (0.20) 2023-10-12 (0.20) install required
 miktex-sync... 2023-05-06 (1.5) 2023-10-12 (1.5) install required
 babel 2023-05-12 (3.89) 2023-11-16 (3.97) install optional
 miktex-dvip... 2023-05-06 (202...) 2023-10-12 (202...) install required
 miktex-posi... 2023-05-06 (2.3.6) 2023-10-12 (2.3.6) install required
 l3backend 2023-04-27 2023-11-16 install optional
 caption 2023-03-17 2023-10-03 install optional
 luaotfload 2022-10-07 (3.23) 2023-09-03 (3.26) install optional
 miktex-con... 2023-05-06 (23.5) 2023-10-12 (23...) install required
 miktex-libre... 2023-05-06 (3.1.4) 2023-10-12 (3.8.1) install required
 miktex-teck... 2023-05-06 (2.5...) 2023-10-12 (2.5...) install required
 miktex-mfw... 2023-05-06 2023-10-12 install required
 miktex-cwe... 2023-05-06 (4.7) 2023-10-12 (4.7) install required
 revtex 2020-10-06 (4.2e) 2023-06-17 (4.2f) install optional
 miktex-aren... 2023-05-06 (6.0...) 2023-10-12 (6.0...) install required

MiKTeX Console

MiKTeX Console 4.9

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MiKTeX Console is free software. You are welcome to redistribute it under certain conditions.

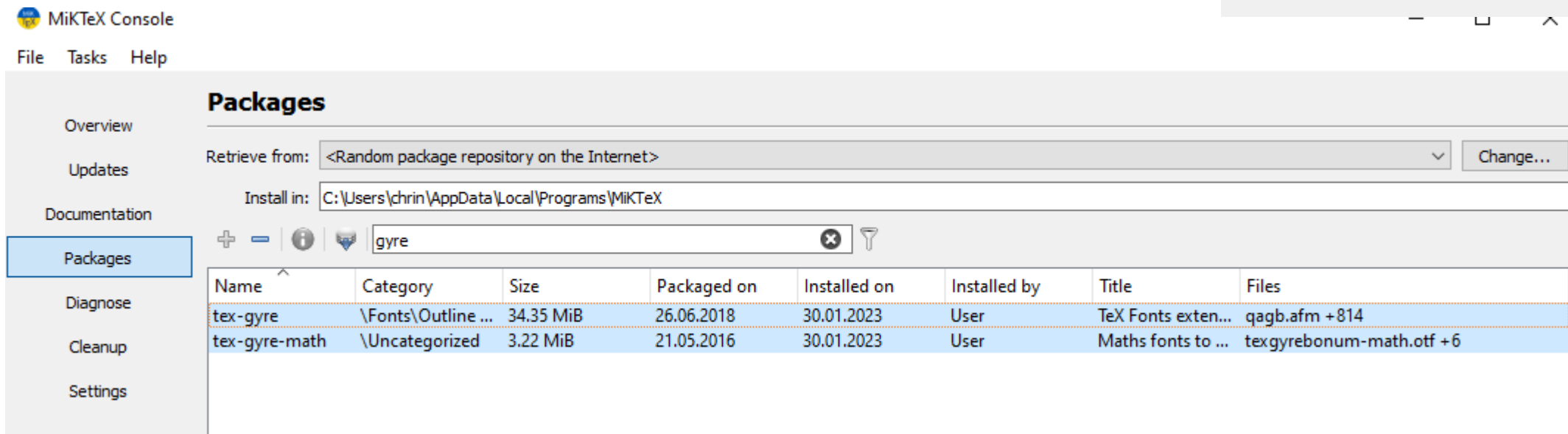
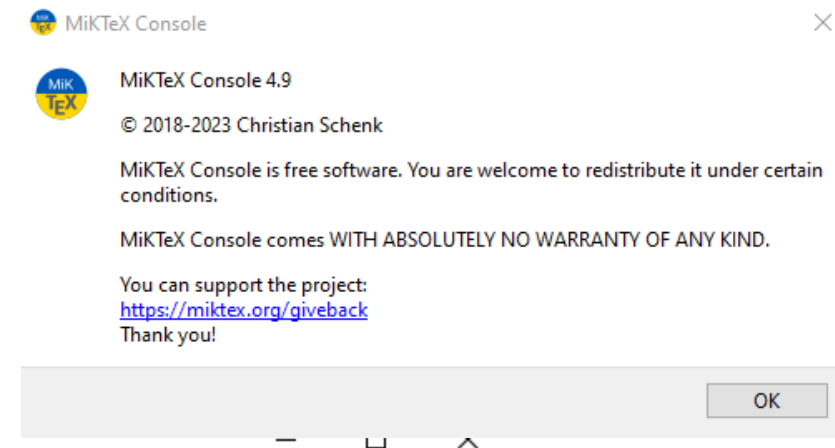
MiKTeX Console comes WITH ABSOLUTELY NO WARRANTY OF ANY KIND.

You can support the project:
<https://miktex.org/giveback>
 Thank you!

OK

Manage updates, packages manually with MiKTeX console.

tex-gyre and **tex-gyre-math** packages may need to be specifically sought out.



Current `jacow.cls` version is v2.98j

<https://jacow.org/Authors/LaTeX>

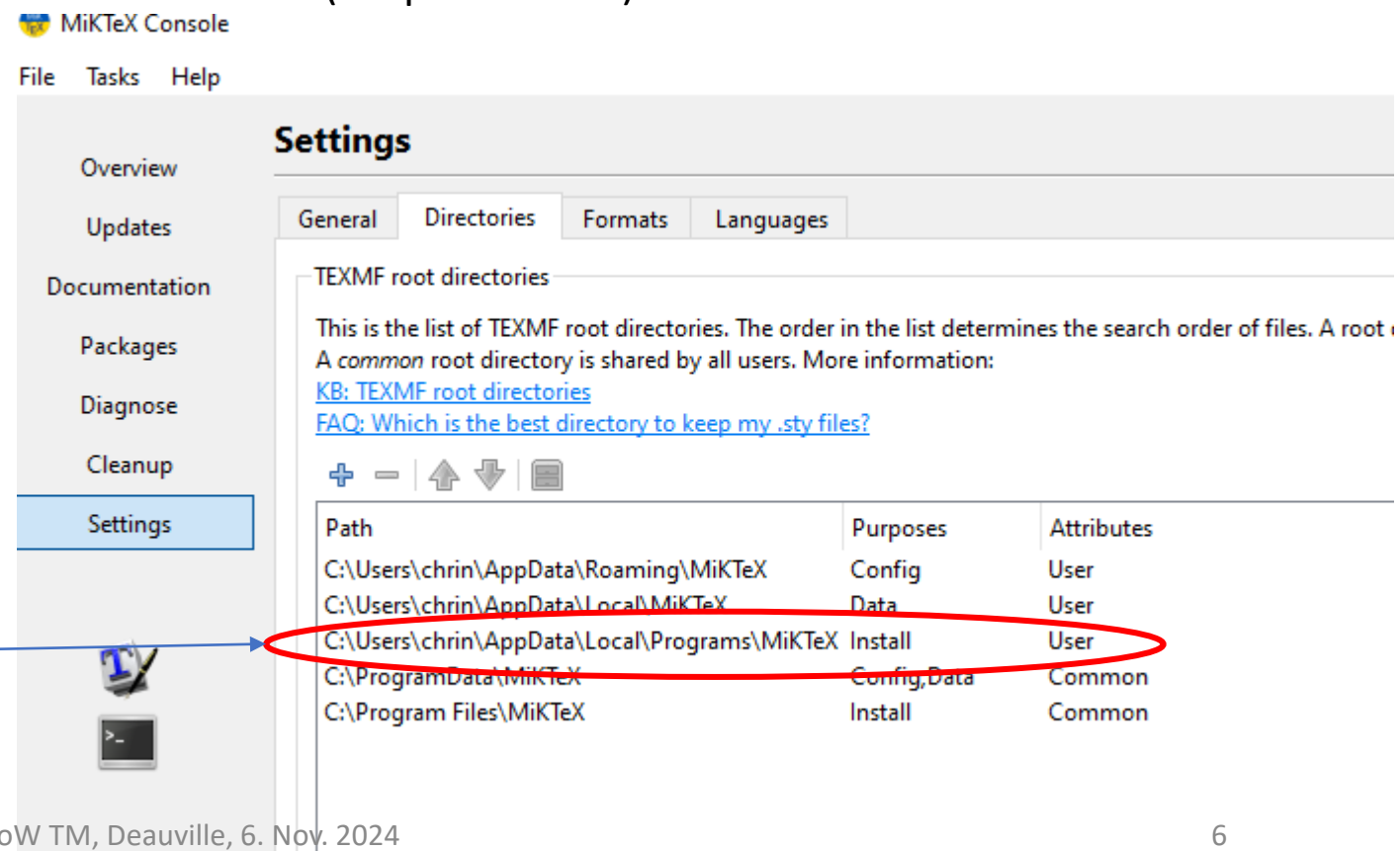
MiKTeX installation comes with `jacow.cls` but it may not be the latest version

Check that yr Editors are using the latest class file!

Latest `jacow.cls` file to be copied into user's local MiKTeX directory

`C:\Users\\AppData\Local\Programs\MiKTeX\tex\latex`

MiKTeX Console -> Settings -> Directories (Purpose Install)



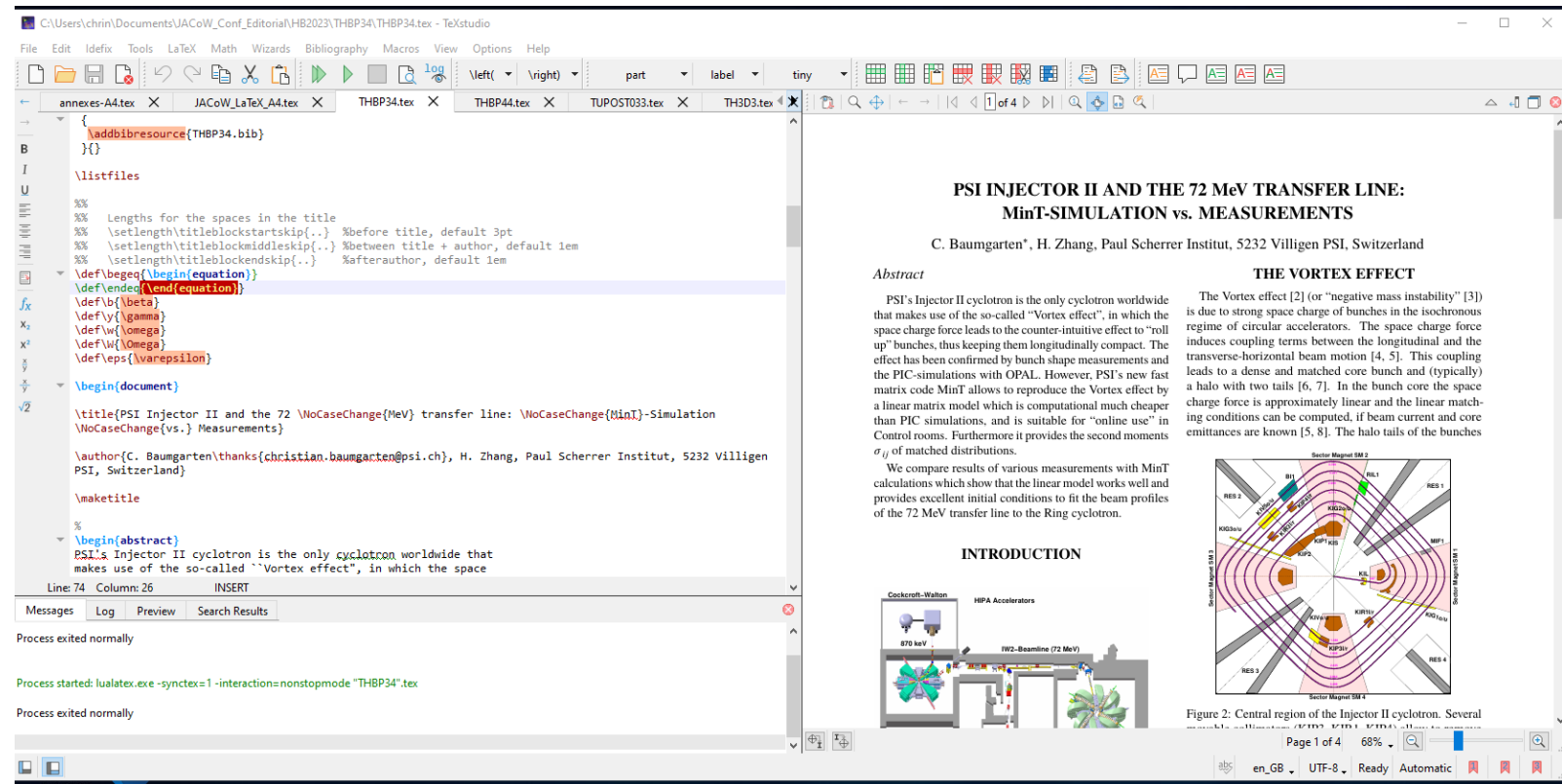
TeX Front-ends (i.e., GUI, LaTeX Editors)

Multi-platform, open-source LaTeX editors:

- TeXstudio
- TeXnicCenter (Windows only)
- TeXworks
- WinEdt (Windows only)
- Visual Studio Code (VS Code)
- Overleaf (Web)

JACoW favourite: TeXstudio

- user friendly
- integrated viewer
- errors clearly displayed
- ...



NB. TeXstudio does not provide LaTeX itself. User must choose a TeX distribution (MiKTeX) and install it first.

The formatting in LaTeX documents is determined by the **class**.

class file names have the **.cls** extension.

First line in a LaTeX source file (**.tex**) is a document class declaration command

```
\documentclass{article}
```

article – scientific journals, short reports

report – longer reports with chapters, thesis, etc.

book – novels, manuals

slides – for slides

letter – for writing letters

jacow – for JACoW papers!

The look can be modified, and more functionalities added by means of a package.

(preloaded thru `\usepackage{<package-name>}` – expect to load several for more refined control)

package file names have the **.sty** extension.

```
\documentclass{jacow}
```

When you write `\documentclass{jacow}` in your LaTeX file, you are including the class file `jacow.cls`

This defines all the commands like `\title`, `\section` which go into structuring your document.

```
\title{A High Brightness Photogun}
```

renders (capitalized, bold, 14pt, centered): **A HIGH BRIGHTNESS PHOTOGUN**

```
\section{RF Shielding in Compact Light Sources}
```

renders (capitalized, bold, 12pt, centered): **RF SHIELDING IN COMPACT LIGHT SOURCES**

Certain words are immutable (units, facilities)

```
\title{The 3 \NoCaseChange{GeV} Taiwan Light Source}
```

renders: **THE 3 GeV TAIWAN LIGHT SOURCE**

```
\section{RF Shielding at \NoCaseChange{SPRing-8}}
```

Renders: **RF SHIELDING AT SPRing-8**

`\usepackage{siunitx}` (already preloaded in `jacow.cls`)

New documents should use `\qty` in place of the deprecated `\SI` command

`\qty{10}{\um}` or `\qty{10}{\micro\meter}` - required way to get an upright unit 10 μm

`\qty{10}{m}` will give optimized spacing (thin space) between digit and unit

else use `\,` to render a thin space between digit and unit: `10\,m` (rather than `10 m`)

Exceptions: `10°C` renders 10°C ... but better still, use `\qty{10}{\Celsius}`

	<code>\$10^{\circ}\$C</code>	→	10°C
<code>\usepackage{gensymb}</code>	<code>\degree</code>	→	10° C
<code>\usepackage{textcomp}</code>	<code>\textdegree</code>	→	10° C

Emittance is typically measured in units of $\pi \cdot \text{mm} \cdot \text{mrad}$

```
\qty{1.0}{\textpi}$\cdot$\unit{mm}$\cdot$\unit{\milli\radian}
```

1.0 $\pi \cdot \text{mm} \cdot \text{mrad}$

```
\qty{1.0}{\textpi}$\blank$\unit{mm}$\blank$\unit{\milli\radian}
```

1.0 $\pi \cdot \text{mm} \cdot \text{mrad}$

Define `\newcommand` in `jacow.cls` file to render $\pi \cdot \text{mm} \cdot \text{mrad}$ (?)

Should there be a space before the %? **10% or 10 %?** No real consensus – but yes!

Rendering spaces:

Thin: `10\,%` or `10\thinspace \%` (1/12em)

Medium: `10\:%`  10 %

Full: `10~\%`  10 %

Thick: `10\;%`

Should there be a space before the %? 10% or 10 %? No real consensus – but...

Rendering spaces:

Thin: `10\,%` or `10\thinspace %` (1/12em)

Medium: `10\;%`

Full: `10~%`

Thick: `10\;%`

10 %

10 %

10 %

favourite

VAR

Video Assistant Referee

L'assistance vidéo à l'arbitrage

Upright Greek characters: `\usepackage{textgreek}`

`\textpi` π

`\textPi` Π

`\textmu` μ or `\unit{\micro}` from `siunitx` package

`\textmicro` μ

Formatting Tables – avoid unnecessarily cluttering with horizontal and vertical lines
(see template to learn about `\toprule` `\midrule` `\bottomrule` for thickness of lines)

```
\begin{table}
\caption{Table Heading}
```

```
\centering
\begin{tabular}{l c c }
```

```
\toprule
\textbf{Heading 1} & \textbf{Heading 2} & \textbf{Heading 3}
```

```
\midrule
1 & 2 & 3 \\
4 & 5 & 6 \\
```

```
\bottomrule
\end{tabular}
\label{Tab:Tab1}
\end{table}
```

Table 2: Table Heading

Heading 1	Heading 2	Heading 3
Row 1	A	B
Row 2	C	D

To increase row spacing in table

```

\begin{table}
\caption{Table Heading}
\renewcommand{\arraystretch}{1.2}
\centering
\begin{tabular}{l c c }
\toprule
Column 1 Heading & Column 2 Heading & Column 3 Heading \\
\midrule
1 & & 2 & & 3 \\
...
\bottomrule
\end{tabular}
\label{Tab:Tab1}
\end{table}

```

Table 2: Table Heading

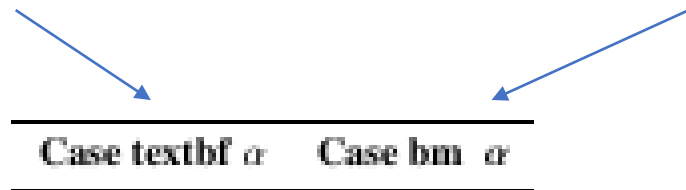
Heading 1	Heading 2	Heading 3
Row 1	A	B
Row 2	C	D

Column Headings in Tables should be in bold face.

`\textbf` command does not operate for **math mode**, e.g., `\textbf{\$alpha\$}`

`\usepackage{bm}` for bold face for **math mode** in table

& `\textbf{Case textbf \$alpha\$}` & `\textbf{Case bm} \bm{\$alpha\$}` &



Case textbf α	Case bm α
----------------------	------------------

Open quotes

``

Two back ticks

Close quotes

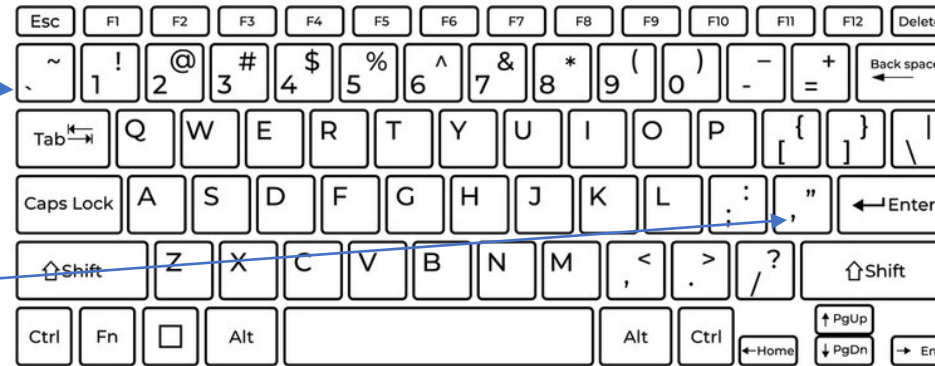
''

Two single quotes

`\usepackage{csquotes}` (In jacow.cls file)

`\textquotedblleft`

`\textquotedblright`



`\usepackage{dirtytalk}`

`\say{Title of paper in \say{sentence} case}`

```Title of paper in `sentence' case''`

Removing or adding blank space, e.g., after figures

```
\vspace{0.5 cm}
```

```
\vspace{-\baselineskip}
```

`\baselineskip` – vertical distance between lines

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- **.bib** file stores all data about the reference (author, journal, year) in a structured way. To use a **.bib** file/database with the LaTeX (**.tex**) document, a processor is needed to transform the **.bib** file into something (**.bbl**) that the **.tex** file will understand

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*The state-of-the-art solution is [the biblatex package](#) together with [the biber program](#)*

Magic comments are comments of the form `% !TEX` or `% !BIB` ... that can be used as directives in many tex editors, for example to specify (from within the document body), which tex engine should be used, the encoding, the language for spell checking etc.

```
% !BIB TS-program = biber/bibtex The TS stands for TeXShop,
% !BIB program = biber/bibtex
% !TeX spellcheck = en_GB/en_US
% !TeX program = pdflatex/lualatex/xelatex
% !TeX encoding = UTF-8 Unicode/IsoLatin
```

```
\documentclass[] {jacow}
\usepackage{biblatex}
\addbibresource{MOP01.bib} %Imports the bibtex data file
\begin{document}
\printbibliography %Prints the list of cited references, under title REFERENCES
\end{document}
```

## New Editors:

1. Familiarize yourself with the style guide detailed in the template.  
The devil is in the details!
2. Develop the technical TeX skills to execute changes.  
Don't be scared of error messages! Read 'em and fix 'em!

## Author, Institute listing (by institute; or by author)

Minimal information to identify the institute (no post codes required) in a consistent way, while respecting that some institutes require that they be listed in a specific way

M. Marx<sup>1</sup>, R. Billen<sup>2</sup>, J. Chrin<sup>3</sup>, H. Franberg Delahaye<sup>4</sup>, R. Saethre<sup>5</sup>

DESY should be addressed as follows:

<sup>1</sup> Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

... and NOT

DESY, Hamburg, Germany

or

Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany

M. Marx<sup>1</sup>, R. Billen<sup>2</sup>, J. Chrin<sup>3</sup>, H. Franberg Delahaye<sup>4</sup>, R. Saethre<sup>5</sup>

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<sup>1</sup> Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

NOTE! Recent directive from DESY management points to:  
Deutsches Elektronen-Synchrotron DESY, Germany

cf. DESY is one lab with two locations – Hamburg and Zeuthen

JACoW template requires that the city be listed!

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<sup>2</sup> CERN, Geneva, Switzerland



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<sup>3</sup> PSI Center for Accelerator Science and Engineering, 5232 Villigen PSI, Switzerland

<sup>4</sup> GANIL-CEA/CNRS, Caen, France

<sup>5</sup> Oak Ridge National Laboratory, Oak Ridge, TN, USA

Lawrence Berkeley National Laboratory, Berkeley, CA, USA  
or LBNL, Berkeley, CA, USA

SLAC National Accelerator Laboratory, Menlo Park, CA, USA  
or SLAC, Menlo Park, CA, USA

Fermi National Accelerator Laboratory, Batavia, IL, USA  
or FNAL, Batavia, IL, USA  
or Fermilab, Batavia, IL, USA

Brookhaven National Laboratory, Upton, NY, USA  
or BNL, Batavia, IL, USA

Grand Accélérateur National d'Ions Lourds - CEA/CNRS, Caen, France  
or GANIL - CEA/CNRS, Caen, France