JACoW Editing in LATEX

JACoW Team Meeting 2026, KEK, Tsukuba, Japan

Joele Mira, iThemba LABS

LaTeX 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*

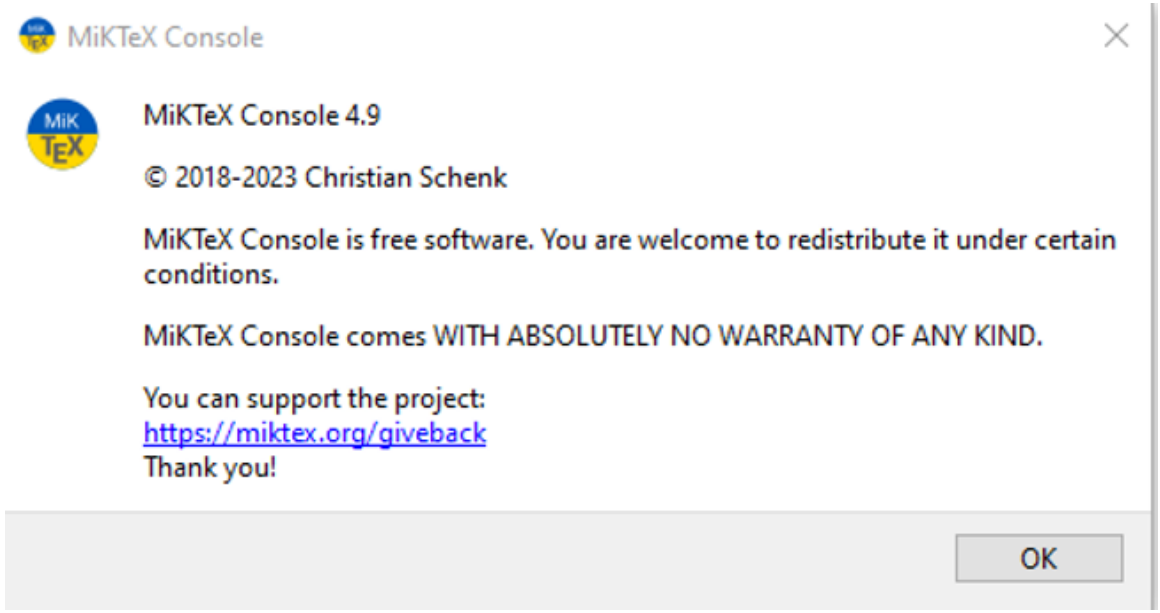
Slide borrowed from Jan Chrin

LATEX Installation

TeX Distributions:

- MiKTeX, TeX Live (Windows, Linux, MacOS)
- MacTeX (TeX Live distribution for MacOS)
- Overleaf (online, ready to use)

MiKTex is the preferred platform in all the JACoW Conferences I served in the Editorial office.



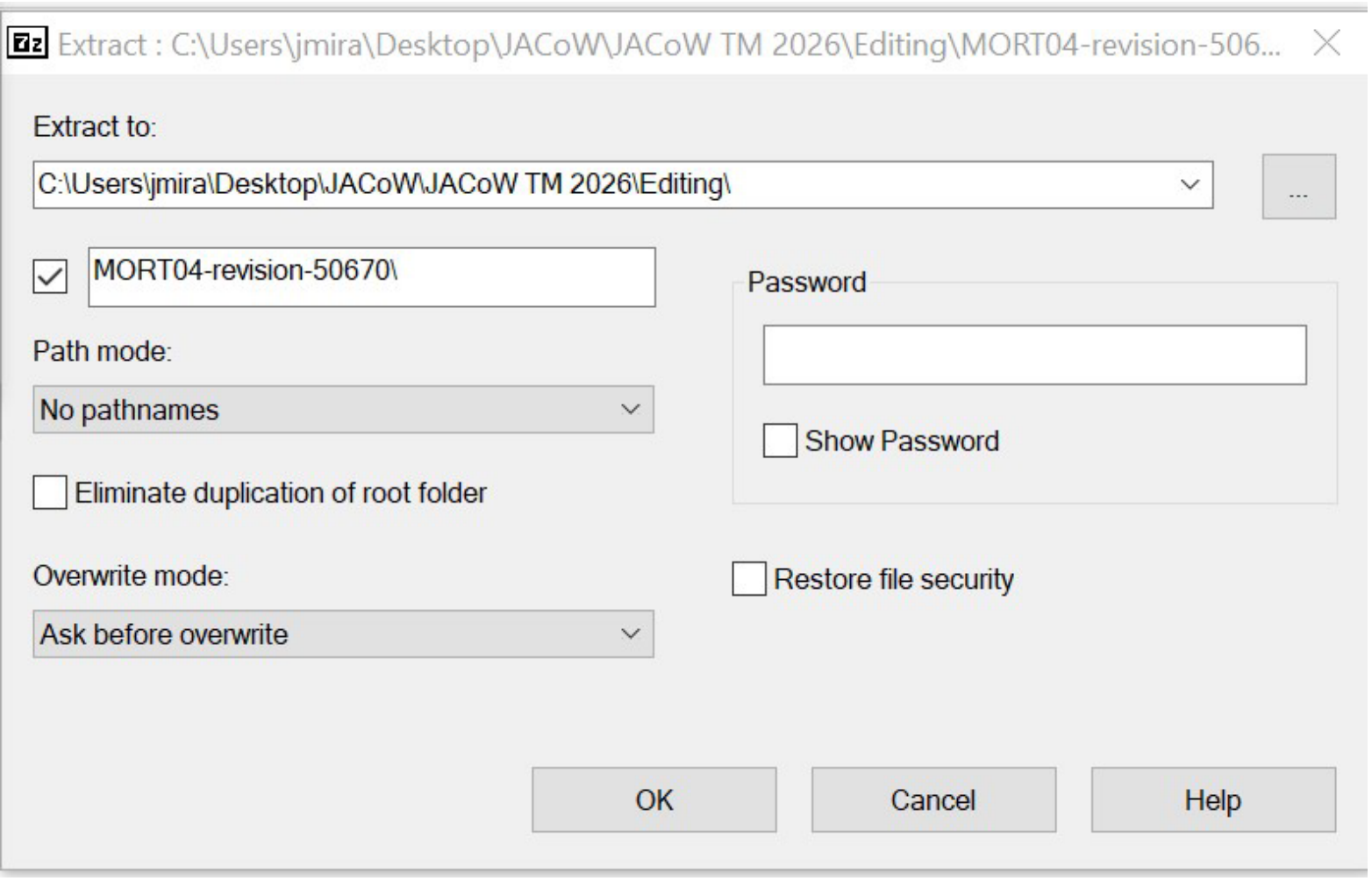
Latex Editors

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

The are various platforms used for editing in LaTeX:

- TeXstudio – mostly preferred at JACoW Editorial office
- TeXnicCenter (Windows only)
- TeXworks
- WinEdt (Windows only)
- Overleaf (Web)

Download and File Extraction

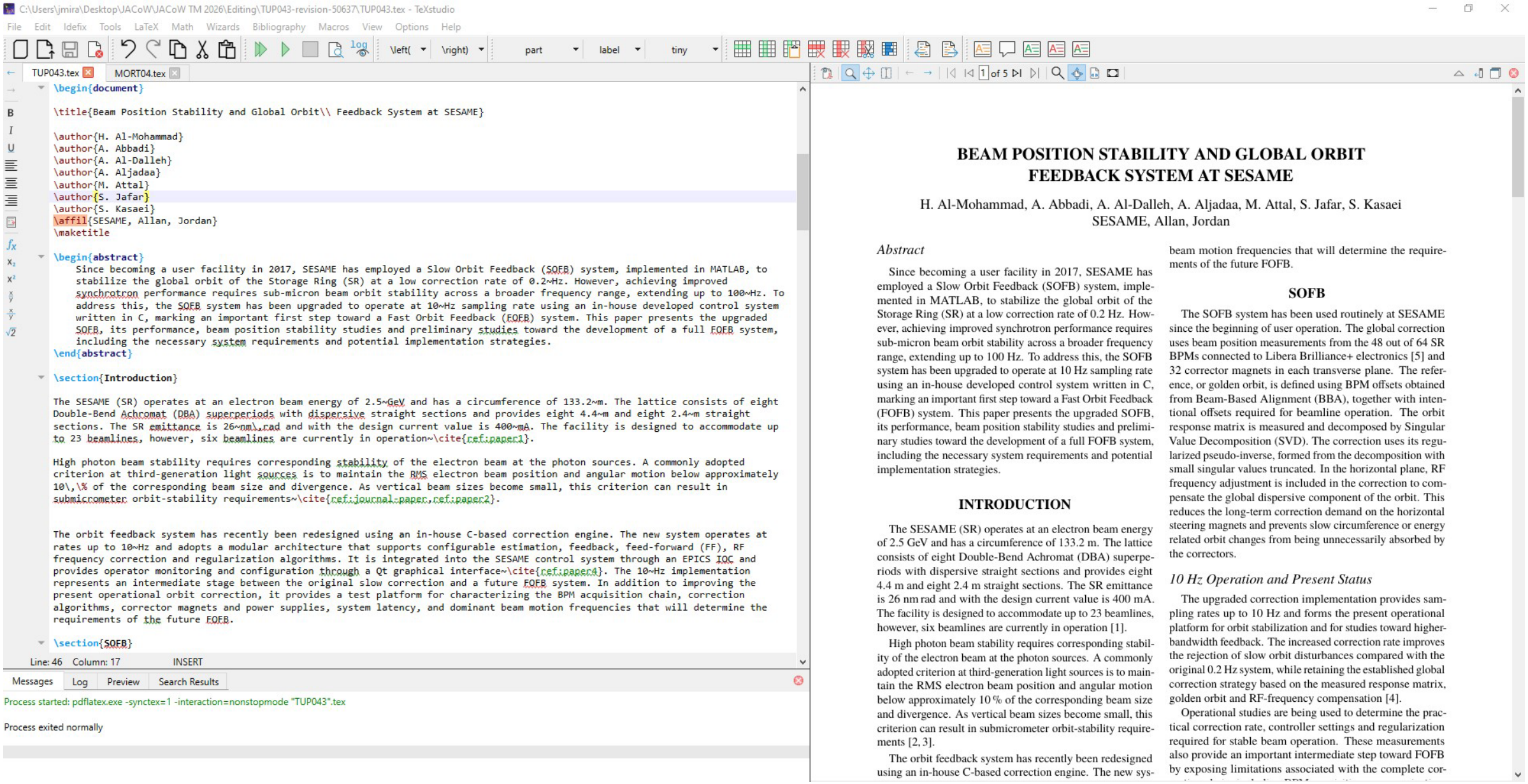


Allows all the document to be extracted into the same folder.

LATEX Template

```
% !BIB TS-program = biber
% !BIB program = biber
% !TeX spellcheck = en_US
% !TeX program = pdflatex
%
% support document for version: v 3.00  Feb 2026   Volker RW Schaa
%
\documentclass[%          % paper size definition not needed as JACoW page size is set
                %boxit,       % show page boundaries to check whether paper is inside correct margins
                %refpage      % references placed on separate page
                biblatex,     % BibLaTeX is to be used
                %nospread,     % flushend option: do not fill with whitespace to balance columns
                %hyphens,      % allow \url to hyphenate at "-" (hyphens)
                %luatex,      % use LuaLaTeX to process the file
                ]{jacow}
%
\usepackage[english]{babel}
\ifboolexpr{bool{jacowbiblatex}}%
{%
                \addbibresource{joele.bib}
}{}
```

LATEX Paper


C:\Users\jmira\Desktop\JACoW\JACoW TM 2026\Editing\TUP043-revision-50637\TUP043.tex - TeXstudio
File Edit Idefix Tools LaTeX Math Wizards Bibliography Macros View Options Help
TUP043.tex
MORT04.tex
\begin{document}
\title{Beam Position Stability and Global Orbit\\ Feedback System at SESAME}
\author{H. Al-Mohammad}
\author{A. Abbadi}
\author{A. Al-Dalleh}
\author{A. Aljadaa}
\author{M. Attal}
\author{S. Jafar}
\author{S. Kasaei}
\affil{SESAME, Allan, Jordan}
\maketitle
\begin{abstract}
Since becoming a user facility in 2017, SESAME has employed a Slow Orbit Feedback (SOFB) system, implemented in MATLAB, to stabilize the global orbit of the Storage Ring (SR) at a low correction rate of 0.2~Hz. However, achieving improved synchrotron performance requires sub-micron beam orbit stability across a broader frequency range, extending up to 100~Hz. To address this, the SOFB system has been upgraded to operate at 10~Hz sampling rate using an in-house developed control system written in C, marking an important first step toward a Fast Orbit Feedback (FOFB) system. This paper presents the upgraded SOFB, its performance, beam position stability studies and preliminary studies toward the development of a full FOFB system, including the necessary system requirements and potential implementation strategies.
\end{abstract}
\section{Introduction}
The SESAME (SR) operates at an electron beam energy of 2.5~GeV and has a circumference of 133.2~m. The lattice consists of eight Double-Bend Achromat (DBA) superperiods with dispersive straight sections and provides eight 4.4~m and eight 2.4~m straight sections. The SR emittance is 26~nm\,rad and with the design current value is 400~mA. The facility is designed to accommodate up to 23 beamlines, however, six beamlines are currently in operation~\cite{ref:paper1}.
High photon beam stability requires corresponding stability of the electron beam at the photon sources. A commonly adopted criterion at third-generation light sources is to maintain the RMS electron beam position and angular motion below approximately 10\,\% of the corresponding beam size and divergence. As vertical beam sizes become small, this criterion can result in submicrometer orbit-stability requirements~\cite{ref:journal-paper,ref:paper2}.
The orbit feedback system has recently been redesigned using an in-house C-based correction engine. The new system operates at rates up to 10~Hz and adopts a modular architecture that supports configurable estimation, feedback, feed-forward (FF), RF frequency correction and regularization algorithms. It is integrated into the SESAME control system through an EPICS IOC and provides operator monitoring and configuration through a Qt graphical interface~\cite{ref:paper4}. The 10~Hz implementation represents an intermediate stage between the original slow correction and a future FOFB system. In addition to improving the present operational orbit correction, it provides a test platform for characterizing the BPM acquisition chain, correction algorithms, corrector magnets and power supplies, system latency, and dominant beam motion frequencies that will determine the requirements of the future FOFB.
\section{SOFB}
Line: 46 Column: 17 INSERT
Messages Log Preview Search Results
Process started: pdflatex.exe -synctex=1 -interaction=nonstopmode "TUP043".tex
Process exited normally
BEAM POSITION STABILITY AND GLOBAL ORBIT FEEDBACK SYSTEM AT SESAME
H. Al-Mohammad, A. Abbadi, A. Al-Dalleh, A. Aljadaa, M. Attal, S. Jafar, S. Kasaei
SESAME, Allan, Jordan
Abstract
Since becoming a user facility in 2017, SESAME has employed a Slow Orbit Feedback (SOFB) system, implemented in MATLAB, to stabilize the global orbit of the Storage Ring (SR) at a low correction rate of 0.2 Hz. However, achieving improved synchrotron performance requires sub-micron beam orbit stability across a broader frequency range, extending up to 100 Hz. To address this, the SOFB system has been upgraded to operate at 10 Hz sampling rate using an in-house developed control system written in C, marking an important first step toward a Fast Orbit Feedback (FOFB) system. This paper presents the upgraded SOFB, its performance, beam position stability studies and preliminary studies toward the development of a full FOFB system, including the necessary system requirements and potential implementation strategies.
INTRODUCTION
The SESAME (SR) operates at an electron beam energy of 2.5 GeV and has a circumference of 133.2 m. The lattice consists of eight Double-Bend Achromat (DBA) superperiods with dispersive straight sections and provides eight 4.4 m and eight 2.4 m straight sections. The SR emittance is 26 nm rad and with the design current value is 400 mA. The facility is designed to accommodate up to 23 beamlines, however, six beamlines are currently in operation [1].
High photon beam stability requires corresponding stability of the electron beam at the photon sources. A commonly adopted criterion at third-generation light sources is to maintain the RMS electron beam position and angular motion below approximately 10 % of the corresponding beam size and divergence. As vertical beam sizes become small, this criterion can result in submicrometer orbit-stability requirements [2, 3].
The orbit feedback system has recently been redesigned using an in-house C-based correction engine. The new system operates at rates up to 10 Hz and adopts a modular architecture that supports configurable estimation, feedback, feed-forward (FF), RF frequency correction and regularization algorithms. It is integrated into the SESAME control system through an EPICS IOC and provides operator monitoring and configuration through a Qt graphical interface [4]. The 10 Hz implementation represents an intermediate stage between the original slow correction and a future FOFB system. In addition to improving the present operational orbit correction, it provides a test platform for characterizing the BPM acquisition chain, correction algorithms, corrector magnets and power supplies, system latency, and dominant beam motion frequencies that will determine the requirements of the future FOFB.
SOFB
The SOFB system has been used routinely at SESAME since the beginning of user operation. The global correction uses beam position measurements from the 48 out of 64 SR BPMs connected to Libera Brilliance+ electronics [5] and 32 corrector magnets in each transverse plane. The reference, or golden orbit, is defined using BPM offsets obtained from Beam-Based Alignment (BBA), together with intentional offsets required for beamline operation. The orbit response matrix is measured and decomposed by Singular Value Decomposition (SVD). The correction uses its regularized pseudo-inverse, formed from the decomposition with small singular values truncated. In the horizontal plane, RF frequency adjustment is included in the correction to compensate the global dispersive component of the orbit. This reduces the long-term correction demand on the horizontal steering magnets and prevents slow circumference or energy related orbit changes from being unnecessarily absorbed by the correctors.
10 Hz Operation and Present Status
The upgraded correction implementation provides sampling rates up to 10 Hz and forms the present operational platform for orbit stabilization and for studies toward higher-bandwidth feedback. The increased correction rate improves the rejection of slow orbit disturbances compared with the original 0.2 Hz system, while retaining the established global correction strategy based on the measured response matrix, golden orbit and RF-frequency compensation [4].
Operational studies are being used to determine the practical correction rate, controller settings and regularization required for stable beam operation. These measurements also provide an important intermediate step toward FOFB by exposing limitations associated with the complete cor-

JACoW Class

```
\documentclass[a4paper]{jacow}
```

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

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

```
\title{Installation of 70~\NoCaseChange{MeV} cyclotron at \NoCaseChange{i}themba labs.}
```

renders: **INSTALLATION OF 70 MeV CYCLOTRON AT iTHEMBA LABS**

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

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

```
\subsection{Results Obtained During Irradiation of Rubidium}
```

Renders: *Results Obtained During Irradiation of Rubidium*

Figure Formatting and Reference

```
\begin{figure}[!htb]
 \centering
  \includegraphics[width=\columnwidth]{JM_F1.png}
  \caption{Joele’s picture while running a marathon.}
  \label{fig:marathon}
\end{figure}

Figure~\ref{fig:marathon} shows Joele running a marathon.
Joele is pictured running a marathon as shown in Fig.~\ref{fig:marathon}
```

SI Units and Spacing

Emphasis on spacing between digit and unit.
`\usepackage{siunitx}` (already preloaded in jacow.cls)

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

\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 `\usepackage{gensymb}` \degree
`\usepackage{textcomp}` \textdegree

Biber Formatting

@article

REQUIRED FIELDS

author, title, journaltitle, date

@book

REQUIRED FIELDS

author, title, publisher, date

@inproceedings

REQUIRED FIELDS

author, title, booktitle, venue, pages, doi

@thesis

REQUIRED FIELDS

author, title, type, institution, date

@report

REQUIRED FIELDS

author, title, type, institution, date

@online

REQUIRED FIELDS

author or editor, title, date, url

Legacy aliases still accepted: journal = journaltitle, year = date, address = location. Run biber with --validate-datamodel to catch missing fields.

Reference Section

```
\begin{thebibliography}{9}

  \bibitem{curcio_duration}

    A. Curcio \emph{et al.}, \textquotedblleft{Measurement of femtosecond
    incoherent XUV pulses using shot-noise-driven fluctuations in plasma betatron
    sources}\textquotedblright, \emph{Phys. Rev. E}, vol.~111, p.~L013201, 2025.
    \doi{10.1103/PhysRevE.111.L013201}


  \bibitem{Attal_IPAC17}

    M. Attal \emph{et al.}, \textquotedblleft{Commisioning of SESAME Storage
    Ring}\textquotedblright, in \emph{Proc. IPAC'17}, Copenhagen, Denmark, May
    2017, pp.~2694--2696.

    \doi{10.18429/JACoW-IPAC2017-WEPAB050}
```

https://woodward.library.ubc.ca/woodward/research-help/journal-abbreviations/

Biber Reference File Format

```
@article{ref:journal-paper,
  author  = {G. Rehm},
  title   = {Achieving and Measuring Sub-Micrometer Beam Stability at 3rd Generation Light Sources},
  journal = {J. Phys.: Conf. Ser.},
  volume  = {425},
  number  = {4},
  pages   = {042001},
  year    = {2013},
  doi     = {10.1088/1742-6596/425/4/042001}
}
```

```
@inproceedings{ref:jacow,
    author = {M. G. Abbott and G. Rehm and I. Uzun},
    title = {A New Fast Data Logger and Viewer at Diamond: the FA Archiver},
    booktitle = {Proc. ICALEPCS'11},
    pages = {1244--1247},
    paper = {THCHMUST03},
    venue = {Grenoble, France, Oct. 2011},
     %date = {Oct. 2011},
    publisher = {JACoW Publishing, Geneva, Switzerland},
    %%url = {https://jacow.org/icalepcs2011/papers/THCHMUST03.pdf},
    language = {english}
}
```

Checklist

1. Load biblatex with backend=biber and choose a style
2. Register your database with \addbibresource{file.bib}
3. Write entries with BibLaTeX field names (date, journaltitle)
4. Cite with \parencite and \textcite; use \autocite to stay style-agnostic
5. Place \printbibliography where the references belong
6. Build with latexmk, and read the .blg log when something breaks

Thank you!

Questions