CLICdp Template

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On behalf of the CLICdp Collaboration

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Abstract

This is the abstract of this note. It should describe the content very briefly, while still giving a good overview of the subject of the note. The purpose of CLICdp notes series is to document the work of the CLICdp Collaboration. Notes shall normally be reviewed by the collaboration and published on the CERN Document Server (CDS). For more information please visit https://clicdp.cern.ch or contact clicdp-pubcom@cern.ch.

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1 Introduction

This document is a collection of examples, guidelines and good practices to bear in mind when writing a CLICdp note. Following this template will ensure a consistent appearance for all CLICdp notes. Further, this guide will show how to generate your own document from this template including the generation of a stand alone cover page to use when another style template is used. The LaTeX template comes with the basic style file `CLICdp.sty` which defines the layout, the included default packages and their settings. The styling of bibliography entries is defined separately in `CLICdp_biblatex.sty`. In addition `CLICdp_definitions.sty` defines many useful macros for commonly used expressions. Section 2 of this document describes how to get the LaTeX template and how to compile it. Section 3 describes the layout of the template, Section 4 describes how to configure the cover page, Section 5 describes how to include figures and tables, Section 6 describes how to write particles, Section 7 describes how to use numbers and units, and Section 8 discusses the citation style. Finally Section 9 discuss the open access licence applied to all document types with the exception of drafts.

2 Getting started

The CLICdp note LaTeX template is available at GitLab (CERN computing account required). Download the directory by following this link[2]. The next step is to create a new directory for your note and copy all necessary files from the template (this step also applies when creating a stand alone cover page). A shell script is available to automatise this step.

```
cd CLICdpTemplate
./createNewCLICdpNote.sh [-p /Optional/Path/] MyNewNote
cd ../MyNewNote/
```

Building the CLICdp template requires pdfTex and biber for the bibliography. This template has been tested on SL6 using the TeXLive 2015 release available at CERN AFS. Execute the following line in your terminal before compiling or add it to your `~/.bashrc`.

```
export PATH=/afs/cern.ch/sw/XML/texlive/latest/bin/x86_64-linux:$PATH
```

This setup is for 64bit linux operating systems. Replace `x86_64-linux` with `i386-linux` for the 32bit version. Afterwards you can execute the following commands to compile the PDF version of the document. Executing biber and pdflatex a second time is required to correctly build the bibliography.

```
pdflatex MyNewNote.tex
biber MyNewNote
pdflatex MyNewNote.tex
```

There is also a shell script available to automatically run the complete chain.

```
. ./build.sh
```

Bibtex is considered obsolete but it can be used instead of biber[3] if desired. Modify `CLICdp.sty` and `build.sh` accordingly.

Some directories are provided; it is suggested to use them to keep the project structured. For example, place figures in a directory called `figures`, additional LaTeX files in a directory called `include`, and place the bibliography files in `bibliography`. Additional .tex files can be included from the main LaTeX file using `\include{FILE}` or `\input{FILE}`. The difference between the two commands

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[2] https://gitlab.cern.ch:8443/CLICdp/Publications/Templates/Style/repository/archive.zip?ref=master

[3] If you encounter an error with how references are displayed with biber or if they are not found, please try to clear the biber cache by running this command: rm -rf 'biber –cache' (backticks).

is that `include` can only appear in the main body of the document and can not be nested. It is useful to create a .tex file for each section to allow for quick removal or re-ordering of individual sections.

3 Page layout and fonts

Symmetric page margins are chosen instead of the increased margin on the inside of a two page layout required for bindings. The left and right page margins are 25 mm. The top and bottom margins are 30 mm. The page header consists of the current section name in the top right separated by a line from the main body of the text. The default serif font is used in italics. The page number is centered on the bottom of the page. The cover page shall be page number 1, although this is not shown. Page numbers start at 2 on the second page. This ensures the page count of the pdf viewer and the page number agree.

The default serif font used is Adobe Times New Roman with a size of 11 pt which is used for the main body of the text, the cover page and formulae. Footnotes have a size of approximately 9 pt. The sans-serif font Helvetica is used for the section headings. Its font size is scaled by 0.92 to adapt the font height to Adobe Times New Roman. Section headings use the size `\Large` (approximately 14 pt) and Subsection headings use the size `\large` (approximately 12 pt). The monospace font Courier is used for URLs, source code, etc.

4 Style of the cover page and other document options

A CLICdp cover page including the unique internal CLICdp identifier (e.g. CLICdp-Note-2017-020) is required for all submissions to CDS. The cover page is automatically generated when using the `\createNewCLICdpNote.sh` as described in secion Section 2. This stand alone page should be used as a preamble for documents prepated using another style template as is often the case for conference proceedings and journal articles, etc. The generated document can be expanded into a full note by adding the corresponding text between `\begindocument` and `\enddocument` commands as illustrated in the .tex file used to generate this guide document.

For conference talks given on behalf of the whole collaboration, a line stating "On behalf of the CLICdp collaboration" has to be added in between the author names and the institute names (see command `\onbehalfof{COLLABORATION}`). In case of an arXiv submission the line "This work was carried out in the framework of the CLICdp collaboration" should instead to be added in italics at the bottom of the page (see command `\titlecomment{COMMENT}`).

Several LaTeX commands are available to configure the cover page of the note:

- `\title{MyNoteTitle}` – defines the main title of the note as it appears on the cover page.

- `\clicdpnote{YEAR}{NUM}`, `\clicdppub{YEAR}{NUM}`, `\clicdpconf{YEAR}{NUM}`, `\clicdpdraft{YEAR}{NUM}` – defines the CLICdp series and its number. Only the last command is taken into account.

- `\date{DATE}` – defines the date as it appears on the cover page. The date should be given as `\today` or `\formatdate{DAY}{MONTH}{YEAR}`.

- `\addauthor{NAME}{\institute{NUM}}` – adds a new author to the list of authors and adds the symbol of the given institute number. The format of the name should be initials of the first name(s) followed by the last name, i.e. `A.~B.~Name`. Multiple institutes can be given. The command can be added multiple times for additional authors. Authors will appear in the order they are added. Footnotes, for example e-mail addresses, can be added to each author name by adding `\thanks{FOOTNOTE}` after the last name.

102 • \addinstitute{NUM}{NAME, COUNTRY} – adds a new institute with a given number. Name
103   and country of the institutes should be given. The command can be added multiple times for addi-
104   tional institutes. Institutes will appear in the order they are added.

105 • \onbehalfof{COLLABORATION} – adds a line with "On behalf of COLLABORATION" in
106   between the author list and the list of institutes. (Optional)

107 • \abstract{ABSTRACT} – defines the abstract text shown on the cover page.

108 • \titlecomment{COMMENT} – adds a comment to the bottom of the cover page, i.e. "Talk
109   presented at some conference". Using the command multiple times will result in the addition of
110   all comments to the bottom of the cover page, each separated by a line break. (Optional)

111 • \notitlestamp – removes the stamp with the note number and the publication date from the
112   top right of the cover page. This is only necessary if this space is required for some other stamp.
113   (Optional)

114 • \draftdocument – adds a large watermark with the word "DRAFT" to each page, adds line
115   numbers and adds a time stamp to the bottom left of every page. (Optional)

116 • \nocolourlinks – changes the colour of all hyperlinks in the text to black, sometimes desired
117   for printing. (Optional)

118 • \nolicence – removes the default CC-BY-4.0 licence, see more details in section Section 9.
119   (Optional)

5 Figures, tables and cross references

121 A CLICdp ROOT style is available at GitLab (CERN computing account required). Download the dir-
122 ectory by following this link[4].
123   This ROOT style emphasises readability and the resulting plots can typically be included with a width
124 of half a page. If possible two plots should be placed next to each other to save space, otherwise they
125 should be placed in the centre. The caption should be placed centered below the figure and begin with
126 "Figure X:". Adding the locations of the figures to the \graphicspath in the preamble allows to
127 include graphics just by name, omitting their path.
128   If the plots are not directly related they should be added with individual captions as shown in Figures 1
129 and 2. This is achieved using the minipage environment within the figure environment as shown in the
130 following example:

```
\begin{figure}
  \begin{minipage}[b]{0.48\textwidth}
    \includegraphics[width=\textwidth]{examplePlot}
    \caption{An example resolution plot from the CDR PFA performance
       studies.}
    \label{fig:example_res}
  \end{minipage}%
  \hfill % fill the space between the figures
  \begin{minipage}[b]{0.48\textwidth}
    \includegraphics[width=\textwidth]{examplePlot2D}
    \caption{A 2D example plot from the CDR chargino analysis.}
    \label{fig:example_2D}
  \end{minipage}
\end{figure}
```

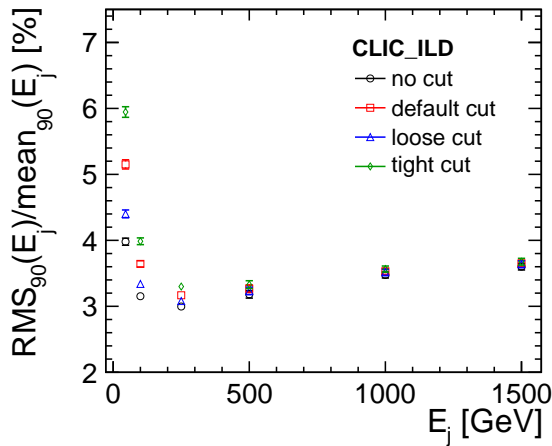[4]https://gitlab.cern.ch:8443/CLICdp/Publications/Templates/Style/repository/archive.zip?ref=master

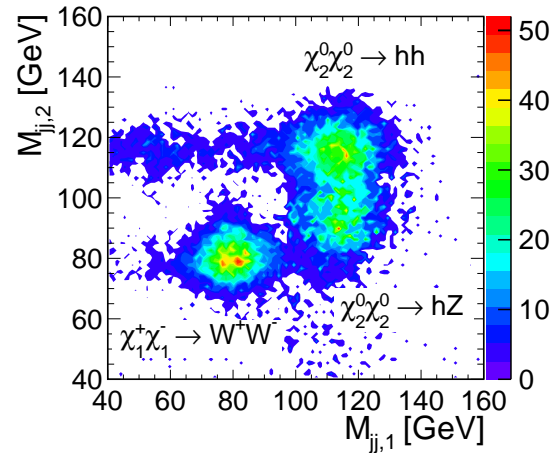Figure 1: An example resolution plot from the CDR PFA performance studies.

Figure 2: A 2D example plot from the CDR chargino analysis.

If the two figures are directly related, a setup with one common caption and (optionally) two sub captions might be preferred, as shown in Figure 3. This layout can be achieved using the subcaption package. It also allows to refer to the subfigures directly by refering to their caption: Figures 3(a) and 3(b).

```
\begin{figure}
  \centering
  \begin{subfigure}[b]{0.48\textwidth}
    \includegraphics[width=\textwidth]{examplePlotFit}
    \caption{Template fit result}
    \label{fig:example_fit}
  \end{subfigure}
  \hfill
  \begin{subfigure}[b]{0.48\textwidth}
    \includegraphics[width=\textwidth]{examplePlotStacked}
    \caption{Stacked histogram}
  \label{fig:example_stacked}
  \end{subfigure}
  \caption{Two example of plots from the CDR physics analysis.
      \subref{fig:example_fit} a template fit from the squark analysis and
      \subref{fig:example_stacked} a stacked histogram from the $\PH \to
      \PQb\PAQb$ analysis.}\label{fig:example_analysis}
\end{figure}
```

Tables are typically placed centered with their caption above. Unnecessary lines should be avoided to improve readability. Vertical lines are usually not required. The horizontal lines in tables should be typeset using the commands from the booktabs package: \toprule, \midrule and \bottomrule. An example table is shown in Table 1, which also illustrates the use of the \multicolumn command.

Cross references should be typed in capital letters, i.e. figures should be referred to as Figure 1, sections as Section 1, etc. This behavior is easily achieved by using the commands provided by the cleverref package. It automatically determines the type of the reference and prepends it to the number, i.e. simply type \cref{LABEL} instead of Figure~\ref{LABEL} in case of figures. The package also treats lists of labels correctly, e.g. simply type \cref{LABEL1, LABEL2, ...} in order to refer to multiple items. Using the \Cref{LABEL} command enforces capitalization which should be used at the beginning of a sentence, in case the configuration is changed from upper case to lower case labels.
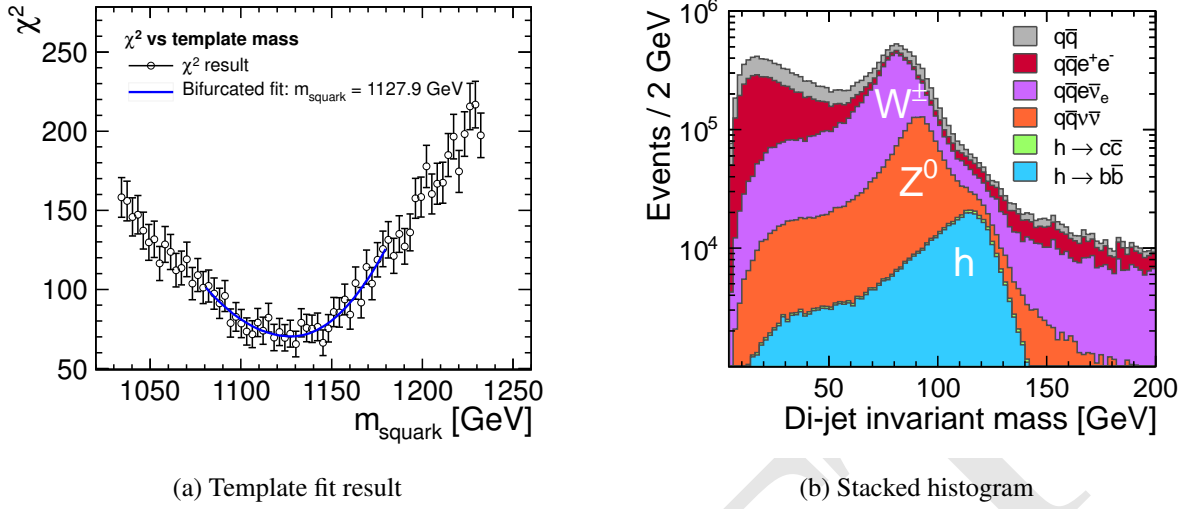
(a) Template fit result

(b) Stacked histogram

Figure 3: Two example of plots from the CDR physics analysis. (a) a template fit from the squark analysis and (b) a stacked histogram from the $H \to b\bar{b}$ analysis.

Table 1: This is an example table showing the machine parameters for CLIC and the ILC for different centre-of-mass energy stages. It also demonstrates the typesetting of numbers and units using the siunitsx package (see Section 7) together with the column option S, resulting in centered decimal points.

Parameter	ILC (TDR)		CLIC (CDR)	
	500 GeV	1 TeV	500 GeV	3 TeV
θ_c [mrad]	14	14	20	20
f_{train} [Hz]	5	4	50	50
n_{bunches}	1312	2450	354	312
Δt [ns]	554	366	0.5	0.5
N [10^9]	20.0	17.4	6.9	3.72
σ_x [nm]	474	481	202	45
σ_y [nm]	5.9	2.8	2.3	1
σ_z [μm]	300	250	72	44
$\mathscr{L}$ [$10^{34}\,\text{cm}^{-2}\,\text{s}^{-1}$]	1.8	3.6	2.3	5.9
$\mathscr{L}_{1\%}$ [$10^{34}\,\text{cm}^{-2}\,\text{s}^{-1}$]	1.0	2.1	1.4	2.0
$\Delta E/E$	0.045	0.056	0.07	0.28
N_{coh}			200	6.8×10^8
E_{coh} [TeV]			15	2.1×10^8
N_{incoh}	1.4×10^5	2.0×10^5	8.0×10^4	3.0×10^5
E_{incoh} [TeV]	344	1.3×10^3	3.6×10^3	2.3×10^4
n_{had}	1.2	2.7	0.3	3.2

All tables and figures that are included should be referenced in the text. Ideally the figure or table should appear on the page of the first reference to it or the following page.

6 Particle names

Particles should be typeset in normal font instead of italics, following the Particle Entity Notation scheme (PEN). Macros for all particles in high energy physics following this scheme are provided by the `heppennames2` package, which is included in this template. The following are some examples for the most common particles:

- Leptons: $l, \bar{l}, e, \mu, \tau, e^{\pm}, \mu^{+}, \tau^{-}, \nu, \bar{\nu}, \nu_e, \bar{\nu}_\mu$

```
\Pl, \PAl, \Pe, \PGm, \PGt, \Pepm, \PGmp, \PGtm, \PGn, \PAGn, \PGne,
    \PAGnGm
```

- Quarks: $q, u, d, s, c, b, t, \bar{q}, \bar{u}, \bar{d}, \bar{s}, \bar{c}, \bar{b}, \bar{t}$

```
\PQq, \PQu, \PQd, \PQs, \PQc, \PQb, \PQt, \PAQq, \PAQu, \PAQd, \PAQs,
    \PAQc, \PAQb, \PAQt
```

- Gauge bosons and scalar bosons: $\gamma, W, W^{\pm}, W^{+}, W^{-}, Z, g, H$

```
\PGg, \PW, \PWpm, \PWp, \PWm, \PZ, \Pg, \PH
```

- Mesons: $\pi, \pi^{0}, \pi^{\pm}, K^{\mp}, K^{0}_{L}, K^{0}_{S}$

```
\PGp, \PGpz, \PGppm, \PKmp, \PKzL, \PKzS
```

- Beyond the Standard Model: $Z', h, A, H^{\pm}, \tilde{g}, \tilde{\chi}^{0}_{1}, \tilde{\chi}^{+}_{2}, \tilde{q}, \bar{\tilde{q}}, \tilde{e}_{L}, \tilde{\mu}^{-}_{R}, G, \tilde{G}$

```
\PZpr, \PSh, \PSA, \PSHpm, \PSg, \PSGczDo, \PSGcpDt, \PSQ, \PASQ,
    \PSeL, \PSGmmR, \PXXG, \PXXSG
```

7 Units

Units should always be typeset in normal font and not in italics. A number and its unit should be separated by a thin space, e.g. 10 GeV instead of 10 GeV or 10GeV. This can be achieved by typing `10\,\text{GeV}`. The `\text` keyword ensures normal font also in math environments. Degrees and percent should have no space if preceded by a number, i.e. 22° and 50%.

All of this can be easily achieved by using the `siunitx` package which is already configured in this template. It provides macros for most units used in physics, and automatically treats ranges of numbers as well as uncertainties. Simple numbers can be written by `\num{NUMBER}`, units without numbers are written as `\si{UNIT}` and numbers with units can be written as `\SI{NUMBER}{UNIT}`. The following are a few examples:

- `\num{1.3e4}` results in 1.3×10^{4}

- `\SI{15}{\kg\m\per\s}` results in $15\,\mathrm{kg\,m\,s^{-1}}$.

- `\SI{2+-0.01}{\per\ab}` results in $(2.00 \pm 0.01)\,\mathrm{ab^{-1}}$.

- `\SIlist{10;20;30}{\MeV}` results in 10 MeV, 20 MeV and 30 MeV.

226 • \SIrange{1}{100}{\GHz} results in 1–100 GHz.

227 • \SI{50}{\percent} results in 50%.

228 • \SI{22}{\degree} results in 22°. (Alternatively use \ang{22} for the same result: 22°).

8 References and citations

230 Citations should be indicated by a number in square brackets. Use a tilde between the text and the cite
231 command to create a whitespace that is not broken over two lines, i.e. text~\cite{REFERENCE}.
232 The references should be listed in the order they appear in the document. This is done automatically by
233 LATEX, but otherwise must be done by the author.

234 The style adopted for the references is that titles of articles or books are given in italics, volumes of
235 journals are given in bold font and everything else is given in normal font. The citations should look as
236 follows:

237 • Journal articles: Author(s), *Title*, Journal **Volume** (Year) First page, DOI, arXiv number.

238 • Books: Author(s), *Title*, Edition, Publisher, Location, Year.

239 • Notes: Author(s), *Title*, Note number, Institute, Year, DOI, arXiv number.

240 In case of more than three authors only the first author should be given followed by "et al.". In case of
241 editor(s) the names should be followed by ", ed(s).". Only the first page is given in case of page ranges
242 and no pagination, i.e. "p." or "pp.", is added in case of journals. The DOI and arXiv numbers should be
243 added as hyperlinks if available. For references that are not published in a journal (e.g. the CLICdp note
244 series), the note number can be made a hyperlink to the document location, i.e. the record on the CERN
245 Document Server (CDS).

246 The LATEX template has the styling defined in the CLICdp_biblatex.sty and no additional con-
247 figuration is required beyond providing all necessary fields in the .bib file(s) for the references. As
248 examples we cite some journal articles [1–3], some books [4, 5], a report with editors [6], a note [7],
249 proceedings [8] and a url [9]. The resulting style can be seen in the references below.

9 Licence

251 All documents (except for drafts) are by default covered by the open access license CC-BY-4.0 (since
252 2017-08-03). Although the majority of the journals of interest for the high-energy physics community
253 today publish under open access there are still some exceptions. It is the responsibility of the author
254 to inform the publications committee about the intended submission to a non open access journal. The
255 committee will then take the appropriate steps to ensure that the publication is treated according to the
256 rules. Please contact the publications committee for any questions regarding your particular document.
257 The licence statement can be removed from the cover page by uncommenting the line \nolicence in
258 your document. Note that the licence statement is never shown for documents while in draft mode. Read
259 more about the licence here: https://creativecommons.org/licenses/by/4.0/.

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