

The `hep-paper` package*

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Abstract

The `hep-paper` package aims to provide a single style file containing most configurations and macros necessary to write appealing publications in High Energy Physics. Instead of reinventing the wheel by introducing newly created macros `hep-paper` preferably loads third party packages as long as they are lightweight enough.

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*This document corresponds to `hep-paper` v1.4.

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1 Introduction

For usual publications it is enough to load additionally to the `article` class without optional arguments only the `hep-paper` package [1].

```
\documentclass{article}
\usepackage{hep-paper}
```

The most notable changes after loading the `hep-paper` package is the change of some L^AT_EX defaults. The paper and font sizes are set to A4 and 11 pt, respectively. Additionally, the paper geometry is set to the values known from the (deprecated) `a4wide` package [2] using the `geometry` package [3]. Furthermore, the font is changed to `lmodern` [4] with `microtype` [5] optimizations. Finally, portable document format (PDF) hyperlinks are implemented with the `hyperref` package [6].

1.1 Options

- paper** The `paper=format` option loads the specified paper format. The possible *formats* are: `a0`, `a1`, `a2`, `a3`, `a4`, `a5`, `a6`, `b0`, `b1`, `b2`, `b3`, `b4`, `b5`, `b6`, `c0`, `c1`, `c2`, `c3`, `c4`, `c5`, `c6`, `ansia`, `ansib`, `ansic`, `ansid`, `ansie`, `letter`, `executive`, `legal`. The default is `a4`.
- font** The `font=size` option loads the specified font size. The possible *sizes* are: `8pt`, `9pt`, `10pt`, `11pt`, `12pt`, `14pt`, `17pt`, `20pt`. The default is `11pt`.
- lang** The `lang=name` option switches the document language to the chosen value. The possible values are given by the `babel` package [7]. The default is `british`.
- sansserif** The `sansserif` option switches the document including math to the sans serif font shape.
- parskip** The `parskip` option makes use of the `parskip` package [8] and changes how two paragraphs are separated from each other. The L^AT_EX default is separation via indentation the `parskip` option switches to separation via vertical space.¹

1.1.1 Deactivation

The `HEP-PAPER` package loads few bigger packages which have a large impact on the document. The deactivation options prevent such adjustments.

- defaults** The `defaults` option prevents the adjustment of the page geometry and the font size set by the document class.
- title** The `title=false` option deactivates the title page adjustments.
- bibliography** The `bibliography=key` option prevents the automatic loading of the `biblatex` package [9] if *key*=`false`. Otherwise the *key* is passed as `style` string to the `biblatex` package.

¹ Although the `parskip` option is used for this document, it is recommended only for very few document types such as technical manuals or answers to referees.

- `glossaries` The `glossaries=false` option deactivates acronyms and the use of the `glossaries` package [10].
- `references` The `references=false` option prevents the `cleveref` package [11] from being loaded and deactivates further redefinitions of reference macros.

1.1.2 Compatibility

The compatibility options activate the compatibility mode for certain classes and packages used for publications in high energy physics. They are mostly suitable combinations of options described in the previous section. If `HEP-PAPER` is able to detect the presence of such a class or package, *i.e.* if it is loaded before the `HEP-PAPER` package, the compatibility mode is activated automatically.

- `beamer` The `beamer` option activates the `BEAMER` [12] compatibility mode.
- `jhep` The `jhep` option activates the `JHEP` [13] compatibility mode.
- `jcap` The `jcap` option activates the `JCAP` [14] compatibility mode.
- `revtex` The `revtex` option activates the `REVTEX` [15] compatibility mode.
- `pos` The `pos` option activates the PoS compatibility mode.

1.1.3 Reactivation

The `HEP-PAPER` package deactivates unrecommended macros, which can be reactivated manually.

- `manualplacement` The `manualplacement` option reactivates manual float placement.
- `eqnarray` The `eqnarray` option reactivates the depreciated `eqnarray` environment.

2 Macros and environments

2.1 Title page

- `\author` In order to facilitate multiple authors with different affiliations the `authblk` package [16] is loaded. The following lines add *e.g.* two authors with different affiliations
- `\affiliation`
- `\email` `\author[1]{Author one \email{Email one}}`
`\affiliation[1]{Affiliation one}`
`\author[2]{Author two \email{Email two}}`
`\affiliation[1,2]{Affiliation two}`
- `\title` The PDF meta information is set according to the `\title{text}` and `\author{text}` information.
- `\preprint` The `\preprint{numer}` macro places a pre-print number in the upper right corner of the title page.
- `abstract` The `abstract` environment is adjusted to not start with an indentation.

2.2 Text

Hyphenation is provided by the `babel` package [7] and quotation commands are provided by the `csquotes` package [17] recommended by the `babel` package. The latter package provides the convenient macros `\enquote{<text>}` and `\MakeOuterQuote{<text>}` allowing to leave the choice of quotation marks to L^AT_EX and use " instead of the pair ‘ ‘ and ’ ’, respectively.

`\eg` The `foreign` package [18] defines macros such as `\eg`, `\ie`, `\cf`, and `\vs` which are typeset as *e.g.*, *i.e.*, *cf.*, and *vs.*

`\no` The `\no{<number>}` macro is typeset as № 123.

`\software` The `\software[<version>]{<name>}` macro is typeset as HEP-PAPER v1.4.

`\online` The `\online{<url>}{<text>}` macro combines the features of the `\href{<url>}{<text>}` [6] and the `\url{<text>}` [19] macros, resulting in *e.g.* `ctan.org/pkg/hep-paper`.

The `inlinelist` and `enumdescript` environments are defined using the `enumitem` package [20].

<code>inlinelist</code>	The three main points are <code>\begin{inlinelist}</code> <code>\item one</code> <code>\item two</code> <code>\item three</code> <code>\end{inlinelist}</code>	The three main points are i) one, ii) two, and iii) three.
-------------------------	---	--

<code>enumdescript</code>	<code>\begin{enumdescript}[label=\Roman*]</code> <code>\item{First} one</code> <code>\item{Second} two</code> <code>\item{Third} three</code> <code>\end{enumdescript}</code>	I) First one II) Second two III) Third three
---------------------------	---	---

`\textsc` A bold versions **SMALL CAPS** and a sans serif version of **SMALL CAPS** is provided, using the `sansmathfonts` package [21].

`\underline` The `\underline` macro is redefined to allow line-breaks using the `ulem` package [22].

`\overline` The `\overline` macro is extended to also overline text outside of math environments.

`\useparskip` If the `parskip` option is activated the `\useparindent` macro switches back the usual parindent mode, while the `\useparskip` macro switches to the `parskip` mode.

`\useparindent`

2.2.1 References and footnotes

`\cref` References are extended with the `cleveref` package [11], which allows to *e.g.* just type `\cref{<key>}` in order to write ‘figure 1’. Furthermore, the `cleveref` package allows to reference multiple objects within one `\cref{<key1,key2>}`.

`\cite` Citations are adjusted to not start on a new line in order to avoid the repeated use

of `\cite{key}`.

`\ref` References are also adjusted to not start on a new line and are redefined in order to handle multiple references at once.

`\eqref`

`\subref` Footnotes are adjusted to swallow white space before the footnote mark and at the beginning of the footnote text.

`\footnote`

2.2.2 Acronyms

`\acronym` The `\acronym{*}[(typeset abbreviation)]{abbreviation}{*}{definition}[(plural definition)]` macro generates the singular `\langle abbreviation \rangle` and plural `\langle abbreviation \rangle s` macros. The first star prevents the addition of an ‘s’ to the abbreviation plural. The

`\shortacronym`

`\longacronym` second star restores the T_EX default of swallowing subsequent white space. The long form is only shown at the first appearance of these macros, later appearances generate the abbreviation with a hyperlink to the long form. Capitalization at the beginning of paragraphs and sentences is ensured. The `\shortacronym` and `\longacronym` macros are drop-in replacements of the `\acronym` macro showing only the short or

`\resetacronym` long form of their acronym. The first use form of the acronym can be enforced by resetting the acronym counter with `\resetacronym{key}`. If the acronym counter equals one at the end of the document the short form of the acronym is not introduced. Placing a `\dummyacronym{key}` at the end of the document ensures that the short form is introduced.

`\dummyacronym`

2.3 Math

The `mathtools` [23] and `amssymb` [24] packages are loaded. They in turn load the

`\mathbf` \mathcal{AMS} -L_AT_EX `amsmath` [25] and `amsfonts` [24] packages. Bold math, via `\mathbf` is improved by the `bm` package [26], *i.e.* ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). Macros switching to `bseries` such as `\section{text}` are ensured to also typeset math in bold. This may cause

`\text` trouble if bold symbols carry an additional non-implicit meaning. The `\text{text}` macro makes it possible to write text within math mode, *i.e.* ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). The often used `\mathrm{text}` and `\rm text` macros are *not* the correct tool for this purpose, as they switch to roman font shape. This behaviour conflicts *e.g.* with the

`\mathsf` `sansserif` package option. The math sans serif alphabet is redefined to be italic sans serif if the main text is serif and italic serif if the main text is sans serif, *i.e.*

`\mathscr` ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). The `\mathcal` font *i.e.* (\mathcal{ABCD}) is accompanied by the `\mathscr` font *i.e.* (\mathscr{ABCD}). The `\mathbb` font is improved by the `doublestroke` package [27] and adjusted depending on the `sansserif` option *i.e.* ($\mathbb{h}1$). Finally, the `\mathfrak` font

`\mathbb`

`\mathfrak` is also available *i.e.* ($\mathfrak{AaBb12}$). Details about the font handling in T_EX can be found in reference [28].

`\nicefrac` The `\frac{number}{number}` macro is accompanied by `\nicefrac{number}`

`\flatfrac` `\{number\}` and `\flatfrac{number}{number}` leading to $\frac{1}{2}$, $\frac{1}{2}$, and $\frac{1}{2}$. Diagonal matrix `\diag` and signum `\sgn` operators are defined.

`\diag`

`\sgn` The `\mathdef{name}[(arguments)]{code}` macro (re-)defines macros only within

`\mathdef`

math mode without changing the text mode definition.

`\i` The imaginary unit `i` and the differential `d` are defined using this functionality.

`\d` For longer paper it can be useful to re-number the equation in accordance with the section numbering `\numberwithin{equation}{section}`. In order to further reduce the size the of equation counter it can be useful to wrap `align` environments with multiple rows in a `subequations` environment. Both macros are provided by the `amsmath` package.

`eqnarray` The depreciated `eqnarray` environment is undefined as long this behaviour is not prevented by the `eqnarray` package option. The `split`, `multline`, `align`, `multlined`, `aligned`, `alignedat`, and `cases` environments of the `amsmath` and `mathtools` packages should be used instead.

`equation` Use the `equation` environment for short equations.

```
\begin{equation}
left = right \ .
\end{equation}
```

$$\boxed{\text{left}} = \boxed{\text{right}} . \quad (1)$$

`multline` Use the `multline` environment for longer equations.

```
\begin{multline}
left = right 1 \\
+ right 2 \ .
\end{multline}
```

$$\boxed{\text{left}} = \boxed{\text{right 1}} + \boxed{\text{right 2}} . \quad (2)$$

`split` Use the `split` sub environment for equations in which multiple equal signs should be aligned.

```
\begin{equation} \begin{split}
left \&= right 1 \\
\&= right 2 \ .
\end{split} \end{equation}
```

$$\boxed{\text{left}} = \boxed{\text{right 1}} = \boxed{\text{right 2}} . \quad (3)$$

`align` Use the `align` environment for the vertical alignment and horizontal distribution of multiple equations.

```
\begin{subequations} \begin{align}
left \&= right \ , \&
left \&= right \ , \&
left \&= right \ , \&
left \&= right \ .
\end{align} \end{subequations}
```

$$\boxed{\text{left}} = \boxed{\text{right}} , \quad \boxed{\text{left}} = \boxed{\text{right}} , \quad (4a)$$

$$\boxed{\text{left}} = \boxed{\text{right}} , \quad \boxed{\text{left}} = \boxed{\text{right}} . \quad (4b)$$

`aligned` Use the `aligned` environment within a `equation` environment if the aligned equations should be labeled with a single equation number.

`multlined` Use the `multlined` environment if either `split` or `align` contain very long lines.

```

\begin{equation} \begin{split}
left \&= right 1 \&=
\begin{multlined}[t]
right 2 \&+ right 3 \ .
\end{multlined}
\end{split} \end{equation}

```

$$\boxed{\text{left}} = \boxed{\text{right 1}} = \boxed{\text{right 2}} + \boxed{\text{right 3}} . \quad (5)$$

`alignat` Use the `alignat` environment together with the `\mathllap` macro for the alignment of multiple equations with vastly different lengths.

```

\begin{subequations}
\begin{alignat}{2}
left \&= long right \&\& \ , \&\&
le. 2 \&= ri. 2 \ , \&
\mathllap{le. 3 = ri. 3} \& \ .
\end{alignat}
\end{subequations}

```

$$\boxed{\text{left}} = \boxed{\text{long right}} , \quad (6a)$$

$$\boxed{\text{le. 2}} = \boxed{\text{ri. 2}} , \quad \boxed{\text{le. 3}} = \boxed{\text{ri. 3}} . \quad (6b)$$

As a rule of thumb if you have to use `\notag`, `\nonumber`, or perform manual spacing via `\quad` you are probably using the wrong environment.

2.3.1 Physics

Greek letters are adjusted to always be italic and upright in math and text mode, respectively, using the `fixmath` [29] and `alphabetabeta` [30] packages. This allows differentiations like

$$\sigma = 5 \text{ fb} , \quad \text{at } 5 \sigma \text{ C.L.} , \quad \mu = 5 \text{ cm} , \quad l = 5 \mu\text{m} , \quad (7)$$

and *e.g.* to distinguish gauge ν and mass \mathfrak{v} eigenstates in models with massive neutrinos. Additionally, Greek letters can also be directly typed using Unicode.

`\ev` The `physics` package [31] provides additional macros such as

```

\pdv
\comm

```

$$\langle \phi \rangle , \quad \frac{\partial^n f}{\partial x^n} , \quad [A, B] , \quad \mathcal{O}(x^2) , \quad x \Big|_0^\infty , \quad \det(M) . \quad (8)$$

`\order`

The `\cancel{\langle characters \rangle}` macro from the `cancel` [32] package and the `\slashed{\langle character \rangle}` macro from the `slashed` [33] package allow to ~~cancel~~ math and use the Dirac slash notation *i.e.* $\cancel{\phi}$, respectively.

`\overleftrighth` A better looking over left right arrow is defined *i.e.* $\overleftrightarrow{\partial}$.

`\unit` The correct spacing for units, *cf.* equation (7), is provided by the macro `\unit[\langle value \rangle]`
`\inv` `\{\langle unit \rangle\}` from the `units` package [34] which can also be used in text mode. The macro `\inv[\langle power \rangle]\{\langle text \rangle\}` allows to avoid math mode also for inverse units such as 5 fb^{-1} typeset via `\unit[5]{\inv{fb}}`.


```

\begin{panels}{.6}
code
\panel{.4}
\begin{tabular}...\end{tabular}
\end{panels}

```

(a) Code for this panel environment.

one		two	
	b	c	d
a	b	c	d

(b) The `booktabs` and `multirow` features.

Table 1: Example use of the `panels` environment in Panel (a) and the features from the `booktabs` and `multirow` packages in Panel (b).

2.4 Floats

`figure` Automatic float placement is adjusted to place a single float at the top of pages and
`table` to reduce the number of float pages, using the L^AT_EX macros.

```

\setcounter{bottomnumber}{0}      no floats at the bottom of a page (default 1)
\setcounter{topnumber}{1}         a single float at the top of a page (default 2)
\setcounter{dbltopnumber}{1}      same for full widths floats in two-column mode
\renewcommand{\textfraction}{.1}  large floats are allowed (default 0.2)
\renewcommand{\topfraction}{.9}   (default 0.7)
\renewcommand{\dbltopfraction}{.9} (default 0.7)
\renewcommand{\floatpagefraction}{.8} float pages must be full (default 0.5)

```

Additionally, manual float placement is deactivated but can be reactivated using the `manualplacement` package option. It is however recommended to archive the desired design by adjusting above macros. The most useful float placement is usually archived by placing the float *in front* of the paragraph it is referenced in first. The float environments have been adjusted to center their content. The usual behaviour can be reactivated using `\raggedright`.

`\raggedright`

`panels` The `panels` environment makes use of the `subcaption` package [35]. It provides
`\panel` sub-floats and takes as mandatory argument either the number of sub-floats (default 2) or the width of the first sub-float as fraction of the `\linewidth`. Within the `\begin{panels}[\langle vertical alignment \rangle]{\langle width \rangle}` environment the `\panel` macro initiates a new sub-float. In the case that the width of the first sub-float has been given as an optional argument to the `panels` environment the `\panel{\langle width \rangle}` macro takes the width of the next sub-float as mandatory argument. The example code is presented in table 1a.

`tabular` The `booktabs` [36] and `multirow` [37] packages are loaded enabling publication quality tabulars such as in table 1b.

`\graphic` The `graphicx` package [38] is loaded and the `\graphic[\langle width \rangle]{\langle figure \rangle}` macro
`\graphics` is defined, which is a wrapper for the `\includegraphics{\langle figure \rangle}` macro and takes the figure width as fraction of the `\linewidth` as optional argument (default 1). If the graphics are located in a sub-folder its path can be indicated by `\graphics{\langle subfolder \rangle}`.

2.5 Bibliography

`\bibliography` The `bibtex` package [9] is loaded for bibliography management. The user has to add the line `\bibliography{\my.bib}` to the preamble of the document and `\printbibliography` at the end of the document. The bibliography is generated by `BIBER` [39]. `bibtex` is extended to be able to cope with the `collaboration` and `reportNumber` fields provided by `inspirehep.net` and a bug in the volume number is fixed. Additionally, the PubMed IDs are recognized and `ctan.org`, `github.com`, `gitlab.com`, `bitbucket.org`, `launchpad.net`, `sourceforge.net`, and `hepforge.org` are valid `eprinttypes`. Errata can be included using the `related` feature.

```
\article{\key1},
...
relatedtype="erratum",
related="\key2",
}
\article{\key2},
...
}
```

3 Conclusion

The `hep-paper` package provides a matching selection of preloaded packages and additional macros enabling the user to focus on the content instead of the layout by reducing the amount of manual tasks. The majority of the loaded packages are fairly lightweight, the others can be deactivated with package options.

`arxiv-collector` `arxiv.org` [40] requires the setup dependent `bb1` files instead of the original `bib` files, which causes trouble if the local `LATEX` version differs from the one used by arXiv. The `arxiv-collector` python script [41] alleviates this problem by collecting all files necessary for publication on arXiv (including figures).

A Options

Load the `pdftexcmds` [42] and `kvoptions` [43] packages and define a `hep` namespace.

```
1 \RequirePackage{pdftexcmds}
2 \RequirePackage{kvoptions}
3 \SetupKeyvalOptions{
4   family=hep,
5   prefix=hep@
6 }
```

paper Define a `paper=size` option. Make A4 paper the default.

```
7 \DeclareStringOption[a4]{paper}
```

font Define a `font=size` option. Make 11 pt the default font size.

```
8 \DeclareStringOption[11pt]{font}
```

lang Define the `lang` option, which takes the values provided by the `babel` package [7]. Make `british` the default language.

```
9 \DeclareStringOption[british]{lang}
```

sansserif Define the option pair `serif` and `sansserif` controlling the font shape of the whole document.

```
10 \DeclareBoolOption[true]{serif}
11 \DeclareComplementaryOption{sansserif}{serif}
```

parskip Define the option pair `parindent` and `parskip` controlling the separation of paragraphs.

```
12 \DeclareBoolOption[true]{parindent}
13 \DeclareComplementaryOption{parskip}{parindent}
```

A.1 Deactivation

defaults Define the `defaults` option which deactivates the `paper` and `font` options and prevents the change of the class defaults by this package.

```
14 \DeclareBoolOption[false]{defaults}
```

title Provide the option `title` for deactivating redefinition of title macros.

```
15 \DeclareBoolOption[true]{title}
```

bibliography Provide the option `bibliography` for passing a `style` string to the `biblatex` package [9] or disabling the automatic loading of `biblatex`.

```
16 \DeclareStringOption[numeric-comp]{bibliography}
```

glossaries Provide the option **glossaries** able to turn of the use of the **glossaries** package [10].

```
17 \DeclareBoolOption[true]{glossaries}
```

references Provide the option **references** for preventing the **cleveref** package from being loaded redefinitions of reference macros.

```
18 \DeclareBoolOption[true]{references}
```

A.2 Compatibility

beamer Provide the option **beamer** for **BEAMER** [12] compatibility mode.

```
19 \DeclareBoolOption[false]{beamer}
```

revtex Provide the option **revtex** for **REVTeX** [15] compatibility mode.

```
20 \DeclareBoolOption[false]{revtex}
```

jhep Provide the option **jhep** for **JHEP** [13] compatibility mode.

```
21 \DeclareBoolOption[false]{jhep}
```

jcap Provide the option **jcap** for **JCAP** [14] compatibility mode.

```
22 \DeclareBoolOption[false]{jcap}
```

pos Provide the option **pos** for **PoS** compatibility mode.

```
23 \DeclareBoolOption[false]{pos}
```

A.3 Reactivation

eqnarray Provide the option **eqnarray** for reactivating the **eqnarray** environment.

```
24 \DeclareBoolOption[false]{eqnarray}
```

manualplacement Provide the **manualplacement** option for reactivating the manual placement of floats.

```
25 \DeclareBoolOption[false]{manualplacement}
```

A.4 Process options

```
26 \ProcessKeyvalOptions*
```

A.5 Set compatibility

Set the **pos** compatibility options.

```
27 \@ifclassloaded{PoS}{\setkeys{hep}{pos}}{}
```

```

28 \ifhep@pos
29   \setkeys{hep}{defaults, title=false}
30   \DeclareRobustCommand\boldmath{\@nomath\boldmath\mathversion{bold}}
31 \fi

```

Set the beamer compatibility options.

```

32 \@ifclassloaded{beamer}{\setkeys{hep}{beamer}}{}
33 \ifhep@beamer
34   \setkeys{hep}{defaults, title=false, references=false, sansserif}
35 \fi

```

Set the revtex compatibility options.

```

36 \@ifclassloaded{revtex4}{\setkeys{hep}{revtex}}{}
37 \@ifclassloaded{revtex4-1}{\setkeys{hep}{revtex}}{}
38 \@ifclassloaded{revtex4-2}{\setkeys{hep}{revtex}}{}
39 \ifhep@revtex
40   \setkeys{hep}{defaults, title=false, bibliography=false, lang=american}
41 \fi

```

Define the SISSA conditional.

```

42 \@ifpackageloaded{jheppub}{\setkeys{hep}{jhep}}{}
43 \@ifpackageloaded{jcapub}{\setkeys{hep}{jcap}}{}
44 \newif\ifhep@sisssa
45 \ifhep@jhep\hep@sisssatrue
46 \else
47   \ifhep@jcap\hep@sisssatrue
48   \else\hep@sissafalse
49   \fi
50 \fi

```

Set the SISSA compatibility options.

```

51 \ifhep@sisssa
52   \setkeys{hep}{title=false, bibliography=false}
53   \PassOptionsToPackage{
54     colorlinks=true, linktocpage=true, pdfproducer=medialab, pdfa=true,
55     urlcolor=blue, anchorcolor=blue, citecolor=blue, filecolor=blue,
56     linkcolor=blue, menucolor=blue, pagecolor=blue
57   }{hyperref}
58   \PassOptionsToPackage{reset}{geometry}
59 \fi

```

Set the JHEP compatibility options.

```

60 \ifhep@jhep
61   \voffset 0in
62   \hoffset 0in
63 \fi

```

B Text

Load the `alphabet` package [30] first in order to archive the correct behaviour. The `alphabet` package provides upright Greek letters in text mode.

```
64 \RequirePackage{alphabet}
```

Set the whole text to sans serif if requested. Load the `sansmathfonts` package [21] first. Although, most fonts will later be overwritten by the `lmodern` package [4] some mathematical objects are ensured to be in sans serif.

```
65 \ifhep@serif\else
66   \RequirePackage{sansmathfonts}
67   \renewcommand\familydefault{\sfdefault}
68 \fi
```

`\ifxetexorluatex` Load the `ifluatex` [44] and `ifxetex` [45] packages. Define the `\ifxetexorluatex` conditional checking if the package is executed by Lua[®]TeX or Xe[®]TeX.

```
69 \RequirePackage{ifluatex}
70 \RequirePackage{ifxetex}
71 \newif\ifxetexorluatex
72 \ifxetex\etexorluatextrue
73 \else
74   \ifluatex\etexorluatextrue
75   \else\etexorluatexfalse
76 \fi
77 \fi
```

Pick the correct font encoding depending on the engine used and load the `fontenc` package [46] with this encoding. For details of the font encoding see [47].

```
78 \ifxetexorluatex
79   \def\hep@encoding{TU}
80 \else
81   \def\hep@encoding{T1}
82 \fi
83 \RequirePackage[\hep@encoding]{fontenc}
```

Fix the remaining coputer modern fonts [48], load the `lmodern` font [4], the `textcomp` extension [49], and the `microtype` font optimization [5].

```
84 \RequirePackage{fix-cm}
85 \RequirePackage{lmodern}
86 \RequirePackage{textcomp}
87 \RequirePackage{microtype}
```

Define bold and sans serif small caps font shapes using the `fontspec` package [50]. The font abbreviations are

lmr Latin modern roman font

lmss Latin modern sans serif font
cmss Computer modern sans serif font
xcmss Extended computer modern sans serif font (from the **sansmathfonts** package [21])
bx Bold extended series
b Bold series
m Medium weight and width series
c Medium weight, condensed width series
sc Caps and small caps font shape

```

88 \ifxetexorluatex
89   \RequirePackage{fontspec}
90   \setmainfont{Latin Modern Roman}[
91     UprightFeatures={SmallCapsFont={\lmromancaps10-regular.otf}}},
92     BoldFeatures={
93       SmallCapsFeatures={Letters=SmallCaps},
94       SmallCapsFont={\cmunbx.otf}
95     }
96   ]
97   \DeclareFontShape{\hep@encoding}{lmss}{bx}{sc}{<->cmssbxcsc10}{}
98   \DeclareFontShape{\hep@encoding}{lmss}{b}{sc}{<->cmssbxcsc10}{}
99   \DeclareFontShape{\hep@encoding}{lmss}{m}{sc}{%
100     <-9>cmsscsc8<9-10>cmsscsc9<10->cmsscsc10%
101   }{}
102 \else
103   \rmfamily
104   \DeclareFontShape{\hep@encoding}{lmr}{b}{sc}{<->ssub*cmr/bx/sc}{}
105   \DeclareFontShape{\hep@encoding}{lmr}{bx}{sc}{<->ssub*cmr/bx/sc}{}
106   \sffamily
107   \DeclareFontShape{\hep@encoding}{lmss}{bx}{sc}{<->ssub*xcms/bx/sc}{}
108   \DeclareFontShape{\hep@encoding}{lmss}{b}{sc}{<->ssub*xcms/bx/sc}{}
109   \DeclareFontShape{\hep@encoding}{lmss}{m}{sc}{<->ssub*xcms/m/sc}{}
110 \fi

```

Load the **inputenc** [51] package.

```

111 \ifxetexorluatex\else
112   \RequirePackage[utf8]{inputenc}
113 \fi

```

Load the **babel** [7] package for hyphenation and the recommended **csquotes** package [17].

```

114 \RequirePackage[\hep@lang]{babel}
115 \RequirePackage{csquotes}

```

\underline Load the **ulem** package [22] for hyphenable underlined text.

```

116 \RequirePackage[normalem]{ulem}
117 \let\underline\uuline

```

B.1 Font size

Undefine previously defined font sizes and load the L^AT_EX font size file corresponding to the font size option.

```
118 \ifhep@defaults\else
119   \def\hep@remove@pt#1pt{#1}
120   \edef\hep@pt@size{\expandafter\hep@remove@pt\hep@font}
121   \let\small\relax
122   \let\footnotesize\relax
123   \let\scriptsize\relax
124   \let\tiny\relax
125   \let\large\relax
126   \let\Large\relax
127   \let\LARGE\relax
128   \let\huge\relax
129   \let\Huge\relax
130   \input{size\hep@pt@size.clo}
131 \fi
```

B.2 Text macros

\vs Load the `foreign` package [18] in order to highlight abbreviations and vocabularies from foreign languages. Add the missing `\vs` command.

```
132 \ifnum\pdf@strcmp{\hep@lang}{american}=0
133   \newcommand{\hep@lang@foreign}{USenglish}
134 \else
135   \ifnum\pdf@strcmp{\hep@lang}{USenglish}=0
136     \newcommand{\hep@lang@foreign}{USenglish}
137   \else
138     \newcommand{\hep@lang@foreign}{british}
139   \fi
140 \fi
141 \RequirePackage{all, \hep@lang@foreign}{foreign}
142 \DeclareRobustCommand\vs{\xperiodafter{\foreignabbrfont{vs}}}
```

The `foreign` package relies on the `xspace` package [52]. Ensure that `\xspace` is compatible with the `\enquote` macro from the `csquote` package.

```
143 \xspaceaddeceptions{\csq@qclose@i}
```

\no Define the macro `\no{<number>}` for the use of \mathbb{N} with appropriate spacing.

```
144 \newcommand{\no}[1]{\textnumero~#1}
```

\software Define a macro for software with optional version information `\software[<version>]{<name>}`, using the `relsize` package [53].

```
145 \RequirePackage{relsize}
```



```

146 \newcommand{\software}[2][\hspace{-\fontdimen2\font}]{%
147   {\smaller\textsc{#2}~#1}%
148 }

```

`\online` Define the `\online{<text>}{<url>}` macro combining the features of the `\href` and the `\url` macros.

```

149 \newcommand{\online}[2]{\href{#1}{\nolinkurl{#2}}}

```

B.3 Lists

Load the `enumitem` package [20].

```

150 \RequirePackage[inline]{enumitem}

```

`inlinelist` Define an inline list environment.

```

151 \newlist{inlinelist}{enumerate*}{1}
152 \setlist*[inlinelist,1]{%
153   label=\roman*), itemjoin={,\ }, itemjoin*={, and\ }, after=.%
154 }

```

`enumdescript` Define an `enumdescript` list environment.

```

155 \newlist{enum@descript}{enumerate}{2}
156 \setlist[enum@descript]{label=\arabic*.}
157 \newenvironment{enumdescript}[1][]{
158   \begin{enum@descript}[#1]
159     \let\hep@item\item
160     \renewcommand{\item}[2][]{
161       \ifx&##1&\hep@item\else\hep@item[##1]\fi
162       \textbf{##2}\ifx##2\empty\else~\fi@ifnextchar\par\@gobble\relax
163     }
164   }\end{enum@descript}}

```

C Geometry

Load the `geometry` package [3] and adjust the text width and height to the values of the `a4wide` package [2]. This step must happen after readjusting the font size in appendix B.1.

```

165 \ifhep@defaults\else
166   \RequirePackage{geometry}
167   \geometry{%
168     \hep@paper paper,
169     hscale=.75,
170     vscale=.8,
171     vmarginratio=3:4,
172     includeheadfoot

```

```

173 }
174 \fi

```

`\useparskip` Load the `parskip` package [8] if requested and provide two commands switching between the two paragraph modes.

`\useparindent`

```

175 \ifhep@parindent\else
176 \RequirePackage{parskip}
177 \newcommand{\useparskip}{%
178   \setlength{\parskip}{.5\baselineskip plus 2pt}%
179   \setlength{\parindent}{0pt}%
180 }
181 \newcommand{\useparindent}{%
182   \setlength{\parskip}{0pt}%
183   \setlength{\parindent}{15pt}%
184   \if@twocolumn\setlength\parindent{1em}
185   \else\setlength\parindent{1.5em}
186   \fi
187 }
188 \fi

```

D Math

Load the `mathtools` package [23] which loads the `amsmath` package [25]. Additionally, load the `amssymb` package [24] which provides further math symbols and also loads the `amsfont` package [24]. Allow page breaks within equations if necessary.

```

189 \RequirePackage{mathtools}
190 \RequirePackage{amssymb}
191 \allowdisplaybreaks[1]

```

`\diag` Provide the `\diag` and `\sgn` operators

```

\sgn
192 \DeclareMathOperator{\diag}{diag}
193 \DeclareMathOperator{\sgn}{sgn}

```

`\mathdef` Define the `\mathdef{⟨name⟩}[⟨arguments⟩]{⟨macro⟩}` macro which (re-)defines macros in math mode only. This macro is implemented using the `xparse` package [54].

```

194 \RequirePackage{xparse}
195 \DeclareDocumentCommand{\mathdef}{m0{0}m}{%
196   \expandafter\let\csname text\string#1\endcsname=#1
197   \expandafter\newcommand\csname math\string#1\endcsname[#2]{#3}
198   \DeclareRobustCommand#1{%
199     \ifmmode
200       \expandafter\let\expandafter\next\csname math\string#1\endcsname
201     \else
202       \expandafter\let\expandafter\next\csname text\string#1\endcsname

```

```

203     \fi
204     \next
205 }%
206 }

```

`\i` Provide an upright imaginary unit in math mode.

```

207 \AtBeginDocument{\mathdef{\i}{\operatorname{i}}}

```

`\overline` Redefine `\overline` to be a text macro using the `ulem` package [22]. Extend it as a math macro with the original definition from `amsmath` [25].

```

208 \def\overline#1{{\renewcommand{\ULdepth}{-1.9ex}}{\uline{#1}}}
209 \DeclareRobustCommand{\over@line}[1]{\@@overline{#1}}
210 \mathdef{\overline}{\over@line}

```

`\left` Load the `mleftright` package [55] and adjust the spacing around `\left` and `\right`.
`\right`

```

211 \RequirePackage{mleftright}
212 \mleftright

```

`eqnarray` Undefine the `eqnarray` environment if not prevented by package option.

```

213 \ifhep@eqnarray\else
214   \let\eqnarray\@undefined
215   \let\endeqnarray\@undefined
216 \fi

```

D.1 Math fonts

`\mathbf` Load the `bm` package [26] for superior boldmath after limiting the number of allocated math alphabets. Make math symbols bold whenever they appear in bold macros such as `\section{<text>}`.

```

217 \ifhep@serif\providecommand{\bmmax}{2}\else\providecommand{\bmmax}{1}\fi
218 \RequirePackage{bm}
219 \let\mathbf\bm
220 \g@addto@macro\bfseries{\boldmath}

```

`\mathsf` Load the `fixmath` package [29] which ensures that upper Greek letters in math mode are italic. Ensure that also math mode is sans serif using the `sfnorm` package [56] if the sans serif option is used. Ensure that `\mathsf` is italic as well as sans serif and sans for sans and sans serif documents, respectively. The font abbreviations are

OML T_EX math italic font encoding
cmm Computer modern math italic font
cmbr Computer modern bright font
bx Bold extended series
m Medium weight and width series

it Italic font shape

```
221 \ifhep@serif
222   \RequirePackage{fixmath}
223   \newcommand\hep@sf@font{cmbr}
224 \else
225   \RequirePackage[slantedGreek]{sfmath}
226   \RequirePackage{sansmathfonts}
227   \newcommand\hep@sf@font{cmm}
228 \fi
229 \SetMathAlphabet{\mathsf}{normal}{OML}{\hep@sf@font}{m}{it}
230 \SetMathAlphabet{\mathsf}{bold}{OML}{\hep@sf@font}{bx}{it}
```

\mathscr Load the mathrsfs package for the **\mathscr** math script font.

```
231 \DeclareMathAlphabet{\mathscr}{U}{rsfs}{m}{n}
```

\mathbb Load the dsfont package [27] and adjust the **\mathbb** math blackboard style font according to the (sans-) serif option.

```
232 \ifhep@serif
233   \newcommand\hep@bb@font{dsrom}
234 \else
235   \newcommand\hep@bb@font{dsss}
236 \fi
237 \SetMathAlphabet{\mathbb}{normal}{U}{\hep@bb@font}{m}{n}
```

D.2 Physics notation

\cancel Load the **physics** package [31] which provides macros useful for publications in physics. Additionally, load the **cancel** [32] and **slashed** [33] packages which provide **\unit** the **\cancel** and **\slashed** macros. Finally, load the **units** package [34] which provides the **\units** and **\nicefrac** macros.

```
238 \RequirePackage{physics}
239 \RequirePackage{cancel}
240 \RequirePackage{slashed}
241 \RequirePackage{units}
```

\inv Provide a macro for the inverse, useful in combination with the **unit** macro in text mode.

```
242 \newcommand{\inv}[2][1]{#2\ensuremath{\sim\!^{-\!#1}}}
```

\d Provide a differential **\d**.

```
243 \AtBeginDocument{\mathdef{\d}{\dd}}
```

\oset Define a new overset macro **\oset**[*offset*]{*over*}{*base*}

```

244 \newcommand{\oset}[3][-1pt]{%
245   \raisebox{1pt}{\ensuremath{\mathop{#3}\limits^{%
246     \vbox to#1{\kern-2\ex@\hbox{$\scriptscriptstyle#2$}\vss}%
247   }}}%
248 }

```

`\overleftrighth` Define a over left right arrow `\overleftrighth{<base>}`.

```

249 \newcommand{\overleftrighth}[1]{\oset{\leftrightharrow}{#1}}

```

E Floats

Adjust the L^AT_EX float placement defaults

```

250 \setcounter{bottomnumber}{0} % 1
251 \setcounter{topnumber}{1} % 2
252 \setcounter{dbltopnumber}{1} % 2
253 \renewcommand{\topfraction}{.9} % .7
254 \renewcommand{\dbltopfraction}{.9} % .7
255 \renewcommand{\textfraction}{.1} % .2
256 \renewcommand{\floatpagefraction}{.8} % .5

```

`figure` Center the content of figure and table environments. Ignore the manual placement
`table` if the manualplacement option is set to false.

```

257 \let\@figure@\figure%
258 \let\@end@figure@\endfigure%
259 \let\@table@\table%
260 \let\@end@table@\endtable%
261 \ifhep@manualplacement%
262   \renewenvironment{figure}[1][tbp]{%
263     \@figure@[#1]\centering%
264   }\@end@figure@}%
265   \renewenvironment{table}[1][tbp]{%
266     \@table@[#1]\centering%
267   }\@end@table@}%
268 \else%
269   \renewenvironment{figure}[1][]{%
270     \@figure@\centering%
271   }\@end@figure@}%
272   \renewenvironment{table}[1][]{%
273     \@table@\centering%
274   }\@end@table@}%
275 \fi%

```

E.1 Sub-floats

`\ifhep@journal` Define a new journal conditional.

```

276 \newif\ifhep@journal
277 \ifhep@sissa\hep@journaltrue
278 \else
279   \ifhep@revtex\hep@journaltrue
280   \else
281     \ifhep@pos\hep@journaltrue
282     \else\hep@journalfalse
283     \fi
284   \fi
285 \fi

```

Prevent the `caption` package [57] from complaining about the journal classes and packages.

```

286 \ifhep@journal
287   \setlength\abovecaptionskip{\f@size\p@}
288   \setlength\belowcaptionskip{0\p@}
289   \long\def\@makecaption#1#2{%
290     \vskip\abovecaptionskip
291     \sbox\@tempboxa{#1: #2}%
292     \ifdim \wd\@tempboxa >\hsize
293       #1: #2\par
294     \else
295       \global \@minipagefalse
296       \hb@xt@\hsize{\hfil\box\@tempboxa\hfil}%
297     \fi
298     \vskip\belowcaptionskip%
299   }
300 \fi

```

Load the `subcaption` package [35]. Provide the old `\subcaption@minipage` macro.

```

301 \RequirePackage[subrefformat=parens]{subcaption}
302 \captionsetup{font=small}
303 \captionsetup[sub]{font=small}
304 \providecommand*\subcaption@minipage[2]{%
305   \minipage#1{#2}\setcaptionsubtype\relax%
306 }

```

`panels` Define the `panels` environment and the `\panel` macro.

```

\panel
307 \newenvironment{panels}[2][b]{%

```

Define an internal macro for global behaviour.

```

308   \newcommand{\begin@subcaption@minipage}[2][b]{%
309     \caption@withoptargs\subcaption@minipage[##1]{##2}%
310     \centering\vskip 0pt%
311   }

```

Define the `\panel` macro for the case that the number of panels is given.

```

312 \ifdim#2pt>1pt%
313   \newcommand{\panel}[1][b]{%
314     \endminipage\hfill\begin@subcaption@minipage[#1]{\linewidth/#2}%
315   }%
316   \begin@subcaption@minipage[#1]{\linewidth/#2}%

```

Define the `\panel` macro for the case that the width of the panel is given.

```

317 \else%
318   \newcommand{\panel}[2][b]{%
319     \endminipage\hfill\begin@subcaption@minipage[#1]{##2\linewidth}%
320   }%
321   \begin@subcaption@minipage[#1]{#2\linewidth}%
322 \fi%
323 }\endminipage}

```

Readjust the captions to the `revtex` class using the `ragged2e` package [58].

```

324 \ifhep@revtex
325   \RequirePackage{ragged2e}
326   \DeclareCaptionFormat{revtex}{#1#2\justifying{#3}}
327   \captionsetup{font=small, format=revtex}
328   \captionsetup[sub]{font=footnotesize, format=plain}
329   \renewcommand{\figurename}{Figure}
330   \renewcommand{\tablename}{Table}
331 \fi

```

E.2 Tables

`tabular` Enhance tabulars with the `booktabs` and `multirow` packages [36, 37].

```

332 \RequirePackage{booktabs}
333 \RequirePackage{multirow}

```

E.3 Figures

`\graphic` Provide the `\graphic` macro for the inclusion of figures using the `graphicx` package [38].

```

334 \RequirePackage{graphicx}
335 \providecommand{\tikzsetnextfilename}[1]{}
336 \newcommand{\graphic}[2][1]{\tikzsetnextfilename{#2}{%
337   \centering\includegraphics[width=#1\linewidth]{#2}\par%
338 }}

```

`\graphics` Provide the `\graphics` macro for the inclusion of figures located in a subfolder.

```

339 \newcommand{\graphics}[1]{\graphicspath{{.#1/}}}

```

F Title page

Begin of title conditional.

```
340 \ifhep@title
```

`\date` Allow absent date field.

```
341 \date{}
```

F.1 Authors

`\author` Allow absent author field.

```
342 \author{}
```

Enable the handling of multiple authors with different affiliations using the `authblk` package [16].

```
343 \RequirePackage{authblk}
344 \renewcommand\Affilfont{\footnotesize}
```

`\email` Define a macro for typesetting emails. Redefine this macro to place the email address in a footnote if called from within the `\author` macro `\author{<name> \email{<email>}}`.

```
345 \newcommand{\email}[1]{\online{mailto:#1}{#1}}
346 \let\hep@author\author
347 \def\author{%
348   \renewcommand{\email}[1]{\unskip\thanks{\online{mailto:##1}{##1}}}%
349   \hep@author
350 }
```

`\affiliation` Define the `\affiliation` macro, ensure that linebreaks happen after a comma.

```
351 \newcommand\active@comma{,\penalty-5\relax}
352 \newcommand\cat@comma@active{\catcode'\,\active}
353 {\cat@comma@active\gdef,{\active@comma}}
354 \newcommand\@affil[1]{%
355   \endgroup\@flushglue=0pt plus .5\linewidth\affil{#1}%
356 }
357 \def\@affil@opt[#1]#2{%
358   \endgroup\@flushglue=0pt plus .5\linewidth\affil[#1]{#2}%
359 }
360 \DeclareRobustCommand\@affiliation{\@ifnextchar[{\@affil@opt}{\@affil}}
361 \newcommand{\affiliation}{\begingroup\cat@comma@active\@affiliation}
```


F.2 Preprint

`\preprint` Define the `\preprint` macro using the `varwidth` package [59].

```
362 \let\@preprint\relax
363 \newcommand\preprint[1]{\long\gdef\@preprint{#1}}
364 \RequirePackage{varwidth}
365 \newcommand{\@preprint@box}{%
366   \begin{varwidth}{\textwidth}%
367   \textsc{\small\@preprint}%
368   \end{varwidth}%
369 }
```

`\maketitle` Places a preprint number in the top right corner of the title page using the `atbegshi` [60] and `picture` [61] packages.

```
370 \RequirePackage{atbegshi}
371 \RequirePackage{picture}
372 \let\hep@maketitle\maketitle
373 \renewcommand{\maketitle}{%
374   \hep@maketitle%
375   \AtBeginShipoutFirst{%
376     \put(
377       \textwidth+\oddsidemargin-\widthof{\@preprint@box},
378       -2pt-\topmargin-\heightof{\@preprint@box}
379     ){\normalfont\@preprint@box}
380   }
381 }
```

F.3 Abstract

`abstract` Adjust the `abstract` environment to not start with indentation.

```
382 \@ifundefined{abstract}{}{%
383   \let\hep@abstract\abstract%
384   \renewcommand\abstract{\hep@abstract\noindent\ignorespaces}%
385 }
```

End of `title` conditional.

```
386 \fi
```

G Bibliography

Check if bibliography management is requested.

```
387 \ifnum\pdfstrcmp{\hep@bibliography}{false}=0\else
```

`\bibliography` Load the `biblatex` package [9] with the `datamodel` defined in appendix J.

```
388 \RequirePackage[style=\hep@bibliography, datamodel=hep-paper]{biblatex}
```

hep-paper Provide the `\DeclareSortingTemplate` macro for older biblatex installations. Define a new sorting template that sorts only multi key `\cite` entries according to their date and leaves the rest of the bibliography entries in the order they appear in the text.

```
389 \providecommand{\DeclareSortingTemplate}{\DeclareSortingScheme}
390 \DeclareSortingTemplate{hep-paper}{
391   \sort{\citeorder}
392   \sort[final]{\field{sortkey}}
393   \sort{\field{sortyear} \field{year} \literal{9999}}
394   \sort{\field{month}}
395   \sort{\field{eprint} \field{doi}}
396   \sort{\field{sorttitle} \field{title}}
397   \sort{\field{subtitle} \field{volume}}
398 }
```

Use the new sorting scheme and abbreviat all first names.

```
399 \ExecuteBibliographyOptions{
400   sorting=hep-paper,
401   giveninits=true
402 }
```

erratum Add new bibliography string ‘Erratum’ for the use in the `relatedtype` field.

```
403 \NewBibliographyString{erratum,erratums}
404 \DefineBibliographyStrings{english}{erratum={Erratum},erratums={Errata}}
405 \providecommand{\relateddelimerratum}{\addsemicolon\space}
```

\printbibliography Allow the bibliography to be printed sloppy

```
406 \let\hep@printbibliography\printbibliography
407 \renewcommand{\printbibliography}{\sloppy\hep@printbibliography}
```

G.1 Sourcemap

\reg@exp@one Define regular expressions in order to deal with inconsistent journal title and volume naming as well as uniform resource locator (URL) protocols and the PMCID.

```
\reg@exp@two
\reg@exp@url
\reg@exp@pmc
408 \newcommand{\reg@exp@one}{\regex{\A(\p{L}+)?\d+(\p{L}+)?\Z}}
409 \newcommand{\reg@exp@two}{\regex{\A(\p{L}+)?(\d+)(\p{L}+)?\Z}}
410 \newcommand{\reg@exp@url}{\regex{\A(ht|f)tp(s)?:\//}}
411 \newcommand{\reg@exp@pmc}{\regex{\A(PMC)?}}
```

\DeclareSourcemap Use the `\DeclareSourcemap` feature.

```
412 \DeclareSourcemap{
413   \maps[datatype=bibtex, overwrite=true]{%
```

collaboration Read the collaboration information if present.

```
414 \map{%
415 \step[fieldsource=Collaboration, final=true]%
416 \step[fieldset=collaboration, origfieldval, final=true]
417 }%
```

reportnumber Read the pre-print information if present.

```
418 \map{%
419 \step[fieldsource=reportNumber, final=true]%
420 \step[fieldset=reportnumber, origfieldval, final=true]
421 }%
```

journal Move letters from the volume field to the journal field.

```
422 \map[overwrite]{
423 \step[fieldsource=volume, match=\reg@exp@one, final]
424 \step[fieldsource=volume, match=\reg@exp@two, replace={$2}]
425 \step[fieldsource=journal, fieldtarget=journaltitle]
426 \step[fieldset=journaltitle, fieldvalue={\space$1$2}, append=true]
427 }
```

url Remove the protocol from URL.

```
428 \map{
429 \step[fieldsource=url, final=true]
430 \step[fieldset=protocollessurl, origfieldval, final=true]
431 \step[fieldsource=protocollessurl, match=\reg@exp@url, replace={}]
432 }
```

pmc Remove the PMC from the PMCID.

```
433 \map{
434 \step[fieldsource=pmcid, final=true]
435 \step[fieldset=pmc, origfieldval, final=true]
436 \step[fieldsource=pmc, match=\reg@exp@pmc, replace={}]
437 }
438 }%
439 }
```

\letbibmacro Provide the \letbibmacro macro for old biblatex installations.

```
440 \providecommand{\letbibmacro}[2]{\csletcs{abx@macro@#1}{abx@macro@#2}}
```

collaboration Execute the author macro even if only the collaboration information if present and override the author information with collaboration information if present.

```
441 \renewbibmacro*{author/translator+others}{%
442 \ifboolexpr{
```

```

443     test \ifuseauthor and (
444         not test {\ifnameundef{author}} or
445         not test {\iffieldundef{collaboration}}
446     )
447 }
448 {\usebibmacro{author}}
449 {\usebibmacro{translator+others}}
450 }
451 \letbibmacro{hep@bib@author}{author}
452 \renewbibmacro*{author}{%
453     \iffieldundef{collaboration}{%
454         \usebibmacro{hep@bib@author}}{\textit{\printfield{collaboration}}}%
455     }%
456 }

```

In: Remove spurious ‘In:’ if no journal is present.

```

457 \renewbibmacro*{in:}{%
458     \iffieldundef{journaltitle}{\printtext{\bibstring{in}\intitlepunct}}%
459 }

```

url Show URLs without the protocol.

```

460 \DeclareFieldFormat{url}{%
461     \mkbibacro{URL}\addcolon\space\online{#1}{\thefield{protocollessurl}}%
462 }

```

\bib@online Private \bib@online macro

```

463 \newcommand{\bib@online}[2]{%
464     \ifhyperref{\online{#1}{#2}}{\nolinkurl{#2}}%
465 }

```

pmid Present PubMed IDs.

pmcid

```

466 \DeclareFieldFormat{pmid}{%
467     \mkbibacro{PM}\addcolon\space%
468     \bib@online{https://www.ncbi.nlm.nih.gov/pubmed/#1}{#1}%
469 }
470 \DeclareFieldFormat{pmc}{%
471     \mkbibacro{PMC}\addcolon\space%
472     \bib@online{https://www.ncbi.nlm.nih.gov/pmc/articles/PMC#1}{#1}%
473 }

```

pmcid Add the pre-print and PubMed information if present.

pmid

reportnumber

```

474 \letbibmacro{hep-doi+eprint+url}{doi+eprint+url}
475 \renewbibmacro*{doi+eprint+url}{%
476     \usebibmacro{hep-doi+eprint+url}
477     \iffieldundef{pmc}{%

```

```

478 \iffielddundef{pmid}{\printfield{pmid}\newunit}%
479 }\printfield{pmc}\newunit}
480 \iffielddundef{reportnumber}{\printfield{reportnumber}\newunit}%
481 \newunitpunct\textnumero\intitlepunct%
482 \textsc{\small\printfield{reportnumber}}%
483 \newunit%
484 }%
485 }

```

G.2 Eprints

`\new@eprint` Private `\new@eprint` macro

```

486 \NewDocumentCommand{\new@eprint}{s}{
487 \DeclareFieldFormat{eprint:#2}{%
488 \newcommand{\@path}{\IfBooleanT{#1}{\thefield{eprintclass}}##1}%
489 #2\addcolon\space\bib@online{#3/\@path}{\@path}%
490 }%
491 }

```

CTAN Add CTAN as a eprint option

```

492 \new@eprint{CTAN}{https://ctan.org/pkg}
493 \DeclareFieldAlias{eprint:ctan}{eprint:CTAN}

```

GitHub Add GitHub as a eprint option

```

494 \new@eprint*{GitHub}{https://github.com}
495 \DeclareFieldAlias{eprint:github}{eprint:GitHub}

```

GitLab Add GitLab as a eprint option

```

496 \new@eprint*{GitLab}{https://gitlab.com}
497 \DeclareFieldAlias{eprint:gitlab}{eprint:GitLab}

```

Bitbucket Add Bitbucket as a eprint option

```

498 \new@eprint*{Bitbucket}{https://bitbucket.org}
499 \DeclareFieldAlias{eprint:bitbucket}{eprint:Bitbucket}

```

Launchpad Add Launchpad as a eprint option

```

500 \new@eprint{Launchpad}{https://launchpad.net}
501 \DeclareFieldAlias{eprint:launchpad}{eprint:Launchpad}

```

SourceForge Add SourceForge as a eprint option

```

502 \new@eprint{SourceForge}{https://sourceforge.net/projects}
503 \DeclareFieldAlias{eprint:launchpad}{eprint:SourceForge}

```

HEPForge Add HEPForge as a eprint option

```
504 \DeclareFieldFormat{eprint:hepforge}{%
505   HEPForge\addcolon\space\bib@online{https://#1/hepforge.org}{#1}%
506 }
507 \DeclareFieldAlias{eprint:HEPForge}{eprint:hepforge}
```

End check for bibliography option.

```
508 \fi
```

H Hyperlinks, Footnotes and References

Load the `hyperref` package [6] enable Unicode encoding and hide links.

```
509 \RequirePackage{hyperref}
510 \hypersetup{
511   pdfencoding=auto, psdextra,
512   hidelinks, linktoc=all, breaklinks=true,
513   pdfcreator={}, pdfproducer={}
514 }
```

Set the PDF meta data according to the paper information and ensure that unnecessary information is suppressed.

```
515 \pdfstringdefDisableCommands{\def\varepsilon{\textepsilon}}
516 \AtBeginDocument{
517   \pdfstringdefDisableCommands{\let\ensuremath@gobble}
518   \pdfstringdefDisableCommands{\let\mathsurround@gobble}
519   \pdfstringdefDisableCommands{\let\unskip@gobble}
520   \pdfstringdefDisableCommands{\let\thanks@gobble}
521   \pdfstringdefDisableCommands{\let\footnote@gobble}
522   \pdfstringdefDisableCommands{\let\\\@gobble}
523 }
524 \ifhep@revtex
525   \AtBeginShipout{\hypersetup{pdftitle={\@title}}}
526 \else
527   \ifhep@beamer\else
528     \AtBeginDocument{\hypersetup{pdftitle={\@title}}}
529   \fi
530 \fi
531 \ifhep@title
532   \AtBeginDocument{\hypersetup{pdfauthor=AB@authlist}}
533 \else
534   \ifhep@beamer\else
535     \AtBeginDocument{\hypersetup{pdfauthor={\@author}}}
536   \fi
537 \fi
```

H.1 Footnotes

Place a hyperlink from the footnote back to its referencing label using the `footnotebackref` package [62].

```
538 \def\BackrefFootnoteTag{}
539 \RequirePackage{footnotebackref}
```

`\footnote` Ensure that no spaces appear before the footmark or at the beginning of the footnote.

```
540 \let\@foot@note\footnote
541 \renewcommand{\footnote}[1]{\unskip\@foot@note{\ignorespaces#1}}
```

H.2 References

Begin of references conditional

```
542 \ifhep@references
```

`\cref` Improve reference using the `cleveref` package [11].

```
543 \RequirePackage[noabbrev, nameinlink]{cleveref}
544 \newcommand{\creflastconjunction}{, and\nobreakspace}
545 \crefname{enumi}{point}{points}
546 \crefname{inlinelisti}{point}{points}
```

`\no@break@before` Define a macro able to prevent line breaks.

```
547 \newcommand\no@break@before{%
548   \relax\ifvmode\else%
549     \ifhmode%
550       \ifdim\lastskip > 0pt%
551         \relax\unskip\nobreakspace%
552       \fi%
553     \fi%
554   \fi%
555 }
```

`\ref` Adjust `\ref{<key>}` in order to prevent preceding line breaks and to enable the possibility to reference multiple references at once.

```
556 \let\hep@ref\ref
557 \AtBeginDocument{\renewcommand\ref{\no@break@before\labelcref}}
```

! Bug ! in equations the additional brackets from the `cleveref` macro conflict with the traditional `(\ref{<key>})` approach

`\eqref` Adjust `\eqref{<key>}` in order to prevent preceding line breaks and to enable the possibility to reference multiple equations at once.

```
558 \renewcommand\eqref{\no@break@before\labelcref}
```

`\subref` Adjust `\subref{<key>}` in order to prevent preceding line breaks.

```
559 \let\hep@subref\subref
560 \renewcommand\subref{\no@break@before\hep@subref}
561 \renewcommand*\subcaption@ref[2]{\begingroup%
562   \caption@setoptions{sub}%
563   \subcaption@reffmt\p@subref{\hep@ref#1{sub@#2}}%
564 \endgroup}
```

`\subcref` Provide the `\subcref` macro.

```
565 \newcommand{\subcref}[1]{\cref{sub@#1}}
```

`\eqcrefname` Define the `\eqcrefname` macro for named equation types.

```
566 \NewDocumentCommand{\eqcrefname}{\mmo}{%
567   \crefname{#1}{#2}{\IfValueTF{#3}{#3}{#2s}}
568   \creflabelformat{#1}{(##2##1##3)}
569 }
```

`\labelcrefrange` Define the missing `\labelcrefrange{<key1>}{<key2>}` macro.

```
570 \DeclareRobustCommand{\labelcrefrange}[2]{%
571   \@crefrangenostar{labelcref}{#1}{#2}%
572 }
```

End of references conditional

```
573 \fi
```

H.3 Citations

`\cite` Adjust `\cite{<key>}` in order to prevent preceding line breaks.

```
574 \let\hep@cite\cite
575 \renewcommand\cite{\no@break@before\hep@cite}
```

Begin of bibliography if.

```
576 \ifnum\pdf@strcmp{\hep@bibliography}{false}=0\else
```

Define bibstrings for reference names.

```
577 \NewBibliographyString{refname}
578 \NewBibliographyString{refsname}
579 \DefineBibliographyStrings{english}{%
580   refname = {reference},
581   refsname = {references}
582 }
```



```

\ccite Define clever citation macros.
\Ccite
583 \DeclareCiteCommand{\ccite}{%
584   \ifnum\thecitetotal=1
585     \bibstring{refname}%
586   \else%
587     \bibstring{refsname}%
588   \fi%
589   \addnbspace\bibopenbracket%
590   \usebibmacro{cite:init}\usebibmacro{prenote}%
591 }{\usebibmacro{cite:index}\usebibmacro{cite:comp}}{}{%
592   \usebibmacro{cite:dump}\usebibmacro{postnote}%
593   \bibclosebracket%
594 }
595
596 \newrobustcmd*{\Ccite}{\bibsentence\ccite}

End of biblatex if.

597 \fi

```

I Acronyms

Acronyms are implemented with the `glossaries-extra` package [63] which is an extension of the `glossaries` package [10] and must be loaded after the `hyperref` package in appendix H.

```

598 \ifhepglossaries
599 \RequirePackage[nostyles]{glossaries-extra}

```

The entry count feature is used.

```

600 \glsenableentrycount
601 \glsssetcategoryattribute{abbreviation}{entrycount}{1}

```

Provide macros for older `glossaries-extra` installations.

```

602 \providecommand{\glsxtrusefield}[2]{\@gls@entry@field{#1}{#2}}
603 \providecommand{\glsxtrsetfieldifexists}[3]{\glsdoifexists{#1}{#3}}
604 \providecommand{\glsXtrSetField}[3]{%
605   \glsxtrsetfieldifexists{#1}{#2}{%
606     \csgdef{glo@glsdetoklabel{#1}@#2}{#3}%
607   }%
608 }

```

Hyperlinks from the abbreviation to their definition in the text are set.

```

609 \glsssetcategoryattribute{abbreviation}{nohyperfirst}{true}
610 \renewcommand*{\glsdonohyperlink}[2]{%
611   \glsxtrprotectlinks\edef\fieldvalue{%

```

```

612   \glstrusefield{\glslabel}{hastarget}%
613 }%
614 \ifdefstring\fieldvalue{true}{#2}{%
615   \gGlsXtrSetField{\glslabel}{hastarget}{true}%
616   \glsdohypertarget{#1}{#2}%
617 }%
618 }}

```

`\begin@sentence` Mark the beginning of a paragraph as if it would follow a full stop using the `everyhook` package [64].

```

619 \RequirePackage[excludeor]{everyhook}
620 \newcommand{\begin@sentence}{1001}
621 \PushPostHook{par}{\spacefactor=\begin@sentence}}

```

`\frenchspacing` Adjust the `\frenchspacing` macro to be compatibel with this idea.

```

622 \def\frenchspacing{%
623   \sfcode'\begin@sentence \sfcode'\begin@sentence
624   \sfcode'\!\begin@sentence \sfcode'\:\begin@sentence
625   \sfcode'\;\@m \sfcode'\,\@m
626 }

```

`\if@begin@of@sentence` Provide a macro checking for the beginning of a sentence by examining the length of the preceeding space.

```

627 \newcommand{\if@begin@of@sentence}[2]{\leavevmode\protecting{%
628   \ifboolexpr{ test {\ifnumcomp{\spacefactor}{=}{3000}} or%
629               test {\ifnumcomp{\spacefactor}{=}{2000}} or%
630               test {\ifnumcomp{\spacefactor}{=}{\begin@sentence}}}%
631   }{#1}{#2}%
632 }}

```

`\acronym` The `\acronym*[(typeset abbreviation)]{abbreviation}{*}{(definition)}[(plural definition)]` macro is defined.

#1 star for omitting the ‘s’ in the short plural
 #2 optional typeset abbreviation
 #3 mandatory abbreviation
 #4 star for restoring the T_EX default for space after text macros
 #5 mandatory long form
 #6 optional plural long form

```

633 \NewDocumentCommand{\acronym}{\somsmo}{
634   \newabbreviation[
635     type=\acronymtype,
636     sort=#3,
637     \glsshortpluralkey=\IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}},
638     longplural=\IfNoValueTF{#6}{#5s}{#6}
639   ]{#3}{\IfNoValueTF{#2}{#3}{#2}}{#5}

```

Provide the singular acronym macro.

```

640 \expandafter\newcommand\csname#3\endcsname{%
641   \if@begin@of@sentence{%
642     \ifglused{#3}{\cgl{s}{#3}}{\cGls{#3}}%
643   }{\cgl{s}{#3}}%
644   \ifnum\gl{s}entrycurrcount{#3}>1\relax
645     \IfBooleanTF{#4}{-}{\@xspace}%
646   \else\@xspace\fi
647 }

```

Expand the singular acronym macro in PDF labels.

```

648 \pdfstringdefDisableCommands{\expandafter\def\csname#3\endcsname{%
649   \IfNoValueTF{#2}{#3}{#2} }%
650 }

```

Provide the singular acronym macro in math mode.

```

651 \expandafter\mathdef\csname#3\endcsname{%
652   \text{\gl{x}trshort{#3}}\@gls@increment@currcount{#3}%
653 }

```

Provide the plural acronym macro.

```

654 \expandafter\newcommand\csname#3s\endcsname{%
655   \if@begin@of@sentence{\cGlspl{#3}}{\cgl{spl}{#3}}%
656   \IfBooleanTF{#4}{-}{\@xspace}%
657 }

```

Expand the plural acronym macro in PDF labels.

```

658 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%
659   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s} }%
660 }

```

Provide the plural acronym macro in math mode.

```

661 \expandafter\mathdef\csname#3s\endcsname{%
662   \text{\gl{x}trshortpl{#3}}\@gls@increment@currcount{#3}%
663 }
664 }

```

`\shortacronym` The `\shortacronym` never expands into the long form.

```

665 \NewDocumentCommand{\shortacronym}{somsmo}{

```

Provide the singular acronym macro.

```

666 \expandafter\newcommand\csname#3\endcsname{%
667   \IfNoValueTF{#2}{#3}{#2}\IfBooleanTF{#4}{-}{\@xspace}%
668 }

```

Expand the singular acronym macro in PDF labels.

```
669 \pdfstringdefDisableCommands{\expandafter\def\csname#3\endcsname{%
670   \IfNoValueTF{#2}{#3}{#2} }%
671 }
```

Provide the singular acronym macro in math mode.

```
672 \expandafter\mathdef\csname#3\endcsname{%
673   \text{\IfNoValueTF{#2}{#3}{#2}}%
674 }
```

Provide the plural acronym macro.

```
675 \expandafter\newcommand\csname#3s\endcsname{%
676   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}}%
677   \IfBooleanTF{#4}{}{\@xspace}%
678 }
```

Expand the plural acronym macro in PDF labels.

```
679 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%
680   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s} }%
681 }
```

Provide the plural acronym macro in math mode.

```
682 \expandafter\mathdef\csname#3s\endcsname{%
683   \text{\IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}}}%
684   }%
685 }
```

`\longacronym` The `\longacronym` never shows the abbreviated form.

```
686 \NewDocumentCommand{\longacronym}{somsmo}{
```

Provide the singular acronym macro.

```
687 \expandafter\newcommand\csname#3\endcsname{%
688   \if@begin@of@sentence{\MakeUppercase#5}{#5}%
689   \IfBooleanTF{#4}{}{\@xspace}%
690 }
```

Expand the singular acronym macro in PDF labels.

```
691 \pdfstringdefDisableCommands{\expandafter\def\csname#3\endcsname{#5 }}
```

Provide the plural acronym macro.

```
692 \expandafter\newcommand\csname#3s\endcsname{%
693   \if@begin@of@sentence{%
694     \IfNoValueTF{#6}{\MakeUppercase#5s}{\MakeUppercase#6}%
695   }
```

```

695     }{%
696         \IfNoValueTF{#6}{#5s}{#6}}\IfBooleanTF{#4}{}{\@xspace}%
697 }

```

Expand the plural acronym macro in PDF labels.

```

698 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%
699     \IfNoValueTF{#6}{#5s}{#6} }%
700 }
701 }

```

Silence warning if no acronyms are defined.

```

702 \renewcommand*{\@gls@write@entrycounts}{%
703     \immediate\write\@auxout{%
704         \string\providecommand*\@string\@gls@entry@count}[2]{%
705             }%
706         \count@=0\relax
707     \forallglsentries{\@glsentry}{%
708         \glshasattribute{\@glsentry}{entrycount}{%
709             \ifglsused{\@glsentry}{%
710                 \immediate\write\@auxout{%
711                     \string\@gls@entry@count{\@glsentry}{%
712                         \glsentrycurrcount{\@glsentry}%
713                     }
714                 }%
715             }}\advance\count@ by \@ne
716         }{}%
717     }%
718 }

```

`\resetacronym` Add two macros for acronym management.

```

\dummyacronym
719 \newcommand{\resetacronym}[1]{\protect\glsreset{#1}}
720 \newcommand{\dummyacronym}[1]{\protect\glsunset{#1}}

```

`abstract` Adjust the `abstract` environment to reset all acronym counters.

```

721 \ifundefined{endabstract}{}{%
722     \let\end@hep@abstract\endabstract%
723     \renewcommand\endabstract{\glsresetall\end@hep@abstract}%
724 }

```

`\tableofcontents` Adjust the `\tableofcontents` macro to never show the long form of acronyms.

```

\listoffigures
\listoftables
725 \let\hep@table@of@contents\tableofcontents
726 \renewcommand\tableofcontents{%
727     \glsunsetall\hep@table@of@contents\glsresetall%
728 }
729 \let\hep@list@of@figures\listoffigures

```

```

730 \renewcommand\listoffigures{%
731   \glsunsetall\hep@list@of@figures\glsresetall%
732 }
733 \let\hep@list@of@tables\listoftables
734 \renewcommand\listoftables{%
735   \glsunsetall\hep@list@of@tables\glsresetall%
736 }

```

`\acronyms` Add a possibility to have different groups of acronyms.

```

737 \NewDocumentCommand{\acronyms}{om}{%
738   \IfNoValueTF{#1}{
739     \newglossary{#2}{#2.in}{#2.out}{#2}%
740     \renewcommand{\acronymtype}{#2}%
741   }{
742     \newglossary{#1}{#1.in}{#1.out}{#2}%
743     \renewcommand{\acronymtype}{#1}%
744   }
745 }

```

End of glossaries if.

```

746 \fi

```

J Biblatex datamodel file

```

collaboration Define the dbx file containing the hep-paper datamodel.
reportnumber
pmid 747 \DeclareDatamodelFields[type=field, datatype=literal]{
pmcid 748   collaboration, reportnumber, pmid, pmcid, pmc,
749 }
pmc 750 \DeclareDatamodelFields[type=field, datatype=uri]{protocollessurl}
protocollessurl 751 \DeclareDatamodelEntryfields{
752   collaboration, reportnumber, pmid, pmcid, pmc, protocollessurl,
753 }

```

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Change History

v1.0		JCAP package options. Fix of
General: Initial version of the style file.	1	incompatibility with recent
v1.1		subcaption package version. Move
General: Transition to documented		of biblatex datamodel into its own
LaTeX source file.	1	file 1
v1.2		v1.4
General: Introduction of package		General: If possible the compatibility
options.	1	options are selected automatically.
v1.3		Inclusion of PubMed IDs in
General: Inclusion of JHEP and		bibliography. 1