

The HEP-PAPER package^{*}

Publications in high energy physics

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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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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 \LaTeX defaults. The paper and font sizes are set to A4 and 11 pt, respectively. Additionally, the paper geometry is adjusted using the `GEOMETRY` package [2]. Furthermore, the font is changed to latin modern (LM) using the `LMODERN` package [3] with `MICROTYPE` [4] optimizations. Finally, portable document format (PDF) hyperlinks are implemented with the `HYPERREF` package [5].

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 11 pt.
- lang** The `lang=<name>` option switches the document language to one of the values values provided by the `BABEL` package [6]. The default is `british`.
- sansserif** The `sansserif` option switches the document including math to sans serif font shape.
- parskip** The `parskip` option changes how paragraphs are separated from each other using the `PARSKIP` package [7]. The \LaTeX default is separation via indentation the `parskip` option switches to separation via vertical space.¹
- symbols** The `symbols=<family>` set the family of the symbol fonts. `symbols=ams` loads two \mathcal{AMS} fonts [8] and the `BM` bold fonts. The default setting replaces additionally the blackboard font with the `DSFONT` [9]. `symbols=minion` switches the symbol fonts to the Adobe MinionPro companion font from the `MNSYMBOL` package [10]. `symbols=false` deactivates additional symbol fonts.

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.

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.

- `bibliography` The `bibliography=<key>` option prevents the automatic loading of the BIBLATEX package [11] if `<key>=false`. Otherwise the `<key>` is passed as `style` string to the BIBLATEX package.
- `glossaries` The `glossaries=false` option deactivates acronyms and the use of the GLOSSARIES package [12].
- `references` The `references=false` option prevents the CLEVEREF package [13] 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 [14] compatibility mode.
- `jhep` The `jhep` option activates the JHEP [15] compatibility mode.
- `jcaph` The `jcaph` option activates the JCAP [16] compatibility mode.
- `revtex` The `revtex` option activates the REVTeX [17] 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

- `\title` The PDF meta information is set according to the `\title{<text>}` and `\author{<text>}` information.
- `\subtitle` The `\subtitle{<subtitle>}` macro is defined using the TITLING package [18].
- `\author` In order to facilitate multiple authors with different affiliations the AUTHBLK package [19] is loaded. The following lines add *e.g.* two authors with different affiliations
- `\affiliation`

```

\author[1]{Author one \email{email one}}
\affiliation[1]{Affiliation one}
\author[2]{Author two \email{email two}}

```

	<code>\affiliation[1,2]{Affiliation two}</code>	
<code>\preprint</code>	The <code>\preprint{⟨number⟩}</code> macro places a pre-print number in the upper right corner of the title page.	
<code>abstract</code>	The <code>abstract</code> environment is adjusted to not start with an indentation.	
<code>\titlefont</code>	Various title font macros are defined, allowing to change the appearance of the	
<code>\subtitlefont</code>	<code>\maketitle</code> output.	
<code>\authorfont</code>	2.2 Text	
<code>\affiliationfont</code>	Hyphenation is provided by the <code>BABEL</code> package [6] and quotation commands	
<code>\preprintfont</code>	are provided by the <code>CSQUOTES</code> package [20] recommended by the <code>BABEL</code> pack-	
<code>\enquote</code>	age. The latter package provides the convenient macros <code>\enquote{⟨text⟩}</code> and	
<code>\MakeOuterQuote</code>	<code>\MakeOuterQuote{″}</code> allowing to leave the choice of quotation marks to \LaTeX and	
	use <code>″</code> instead of the pair <code>“</code> and <code>”</code> , respectively.	
<code>\eg</code>	The <code>FOREIGN</code> package [21] defines macros such as <code>\eg</code> , <code>\ie</code> , <code>\cf</code> , and <code>\vs</code> which are	
<code>\vs</code>	typeset as <i>e.g.</i> , <i>i.e.</i> , <i>cf.</i> , and <i>vs.</i>	
<code>\no</code>	The <code>\no{⟨number⟩}</code> macro is typeset as № 123.	
<code>\software</code>	The <code>\software[⟨version⟩]{⟨name⟩}</code> macro is typeset as HEP-PAPER v1.5.	
<code>\online</code>	The <code>\online{⟨url⟩}{⟨text⟩}</code> macro combines the features of the <code>\href{⟨url⟩}{⟨text⟩}</code> [5]	
	and the <code>\url{⟨text⟩}</code> [22] macros, resulting in <i>e.g.</i> <code>ctan.org/pkg/hep-paper</code> .	
<code>inlinelist</code>	The <code>inlinelist</code> and <code>enumdescript</code> environments are defined using the <code>ENUMITEM</code> pack-	
<code>enumdescript</code>	age [23].	
	The three main points are	The three main points are i) one, ii) two,
	<code>\begin{inlinelist}</code>	and iii) three.
	<code>\item one</code>	
	<code>\item two</code>	
	<code>\item three</code>	
	<code>\end{inlinelist}</code>	
	<code>\begin{enumdescript}[label=\Roman*])</code>	I) First one
	<code>\item{First} one</code>	II) Second two
	<code>\item{Second} two</code>	III) Third three
	<code>\item{Third} three</code>	
	<code>\end{enumdescript}</code>	
<code>\textsc</code>	A bold versions SMALL CAPS and a sans serif version of SMALL CAPS based on the	
	computer modern (CM) font is provided, the latter using the <code>SANSMATHFONTS</code> pack-	
	age [24].	
<code>\underline</code>	The <code>\underline</code> macro is redefined to allow line-breaks using the <code>ULEM</code> package [25].	
<code>\overline</code>	The <code>\overline</code> macro is extended to also <code>\overline</code> text outside of math environments.	
<code>\useparskip</code>	If the <code>parskip</code> option is activated the <code>\useparindent</code> macro switches back the usual	
<code>\useparindent</code>	parindent mode, while the <code>\useparskip</code> macro switches to the <code>parskip</code> mode.	

2.2.1 References and footnotes

<code>\cref</code>	References are extended with the <code>CLEVEREF</code> package [13], which allows to <i>e.g.</i> just type <code>\cref{<key>}</code> in order to write ‘figure 1’. Furthermore, the <code>CLEVEREF</code> package allows to reference multiple objects within one <code>\cref{<key1,key2>}</code> .
<code>\cite</code>	Citations are adjusted to not start on a new line in order to avoid the repeated use of <code>~\cite{<key>}</code> .
<code>\ref</code>	References are also adjusted to not start on a new line.
<code>\eqref</code>	Footnotes are adjusted to swallow white space before the footnote mark and at the
<code>\subref</code>	beginning of the footnote text.
<code>\footnote</code>	

2.2.2 Acronyms

<code>\acronym</code>	The <code>\acronym{<*>[<typeset abbreviation>]{<abbreviation>}{<*>{<definition>}[<plural definition>]}</code> macro generates the singular <code>\<abbreviation></code> and plural <code>\<abbreviation>s</code> macros. The first star prevents the addition of an ‘s’ to the abbreviation plural. The second star restores the \TeX 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 <code>\shortacronym</code> and <code>\longacronym</code> macros are drop-in replacements of the <code>\acronym</code> macro showing only the short or long form of their acronym. The first use form of the acronym can be enforced by resetting the acronym counter with <code>\resetacronym{<key>}</code> . If the acronym counter equals one at the end of the document the short form of the acronym is not introduced. Placing a <code>\dummyacronym{<key>}</code> at the end of the document ensures that the short form is introduced.
<code>\shortacronym</code>	
<code>\longacronym</code>	
<code>\resetacronym</code>	
<code>\dummyacronym</code>	

2.3 Math

<code>\mathbf</code>	The <code>MATHTOOLS</code> [26] and <code>AMSSYMB</code> [8] packages are loaded. They in turn load the <code>AMS-\LaTeX</code> <code>AMSMATH</code> [27] and <code>AMSFONTS</code> [8] packages. Bold math, via <code>\mathbf</code> is improved by the <code>BM</code> package [28], <i>i.e.</i> ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). Macros switching to <code>bfseries</code> such as <code>\section{<text>}</code> are ensured to also typeset math in bold. This may cause trouble if bold symbols carry an additional non-implicit meaning. The <code>\text{<text>}</code> macro makes it possible to write text within math mode, <i>i.e.</i> ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). This behaviour conflicts <i>e.g.</i> with the <code>SANSSERIF</code> 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>i.e.</i> ($Ab\Gamma\delta\mathbf{Ab}\Gamma\delta$). The <code>\mathcal</code> font <i>i.e.</i> (\mathcal{ABCD}) is accompanied by the <code>\mathscr</code> font <i>i.e.</i> (\mathscr{ABCD}). The <code>\mathbb</code> font is improved by the <code>DOUBLESTROKE</code> package [9] and adjusted depending on the <code>sansserif</code> option <i>i.e.</i> ($\mathbb{A}\mathbb{h}\mathbb{I}$). Finally, the <code>\mathfrak</code> font is also available <i>i.e.</i> ($\mathfrak{A}\mathfrak{a}\mathfrak{B}\mathfrak{b}\mathfrak{1}\mathfrak{2}$). Details about the font handling in \TeX can be found in reference [29].
<code>\mathsf</code>	
<code>\mathscr</code>	
<code>\mathbb</code>	
<code>\mathfrak</code>	
<code>\nicefrac</code>	The <code>\frac{<number>}{<number>}</code> macro is accompanied by <code>\nicefrac{<number>}{<number>}</code> and <code>\flatfrac{<number>}{<number>}</code> leading to $\frac{1}{2}$, $\frac{1}{2}$, and $\frac{1}{2}$. Diagonal
<code>\flatfrac</code>	
<code>\diag</code>	
<code>\sgn</code>	

matrix `\diag` and signum `\sgn` operators are defined.

`\mathdef` The `\mathdef{<name>}{<arguments>}{<code>}` macro (re-)defines macros only within 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}
```

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

`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}`

$$\begin{aligned}
\boxed{\text{left}} &= \boxed{\text{right 1}} \\
&= \boxed{\text{right 2}} \\
&\quad \boxed{+ \text{right 3}} .
\end{aligned}
\tag{5}$$

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}`

$$\boxed{\text{left}} = \boxed{\text{long right}} , \tag{6a}$$

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

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` [30] and `ALPHABETA` [31] packages. This allows differentiations like

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

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 [32] provides additional macros such as

`\pdv`
`\comm`

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

`\order`
`\cancel`
`\slashed`

The `\cancel{\langle characters \rangle}` macro from the `CANCEL` package [33] and the `\slashed{\langle character \rangle}` macro from the `SLASHED` package [34] 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`
`\inv`

The correct spacing for units, *cf.* equation (7), is provided by the macro `\unit[\langle value \rangle]{\langle unit \rangle}` from the `UNITS` package [35] 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}}`.

2.4 Floats

figure Automatic float placement is adjusted to place a single float at the top of pages and

table


```
\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).

to reduce the number of float pages, using the \LaTeX 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 [36]. It provides 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.

`\panel`

`tabular` The `BOOKTABS` [37] and `MULTIROW` [38] packages are loaded enabling publication quality tabulars such as in table 1b.

`\graphic` The `GRAPHICX` package [39] is loaded and the `\graphic[\langle width \rangle]{\langle figure \rangle}` macro 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}`.

`\graphics`

2.5 Bibliography

`\bibliography` The `BIBLATEX` package [11] is loaded for bibliography management. The user has

`\printbibliography`

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` [40]. `biblatex` 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` [41] requires the setup dependent `bbl` 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 [42] alleviates this problem by collecting all files necessary for publication on arXiv (including figures).

A Allocation of math alphabets

Of the 16 available math alphabets, $\mathrm{T}_{\mathrm{E}}\mathrm{X}$ loads four alphabets by default

0. **OT1** Text (latin, greek, numerals, text symbols)
1. **OML** Math Italic (latin, greek, numerals, text symbols)
2. **OMS** Symbol ($\backslash\mathrm{mathcal}$, operators)
3. **OMX** Math Extension (big operators, delimiters)

The text font 0. of CM is **cmr10** $\backslash\mathrm{OT1}/\mathrm{cmr}/\mathrm{m}/\mathrm{n}/10$, which is replaced by LM to be **rm-lmr10** $\backslash\mathrm{OT1}/\mathrm{lmr}/\mathrm{m}/\mathrm{n}/10$, the **sansserif** option uses **rm-lmss10** $\backslash\mathrm{OT1}/\mathrm{lmss}/\mathrm{m}/\mathrm{n}/10$. The italic math font 1. of CM is **cmmi10** $\backslash\mathrm{OML}/\mathrm{cmm}/\mathrm{m}/\mathrm{it}/10$, and is replaced by LM to be **lmmi10** $\backslash\mathrm{OML}/\mathrm{lmm}/\mathrm{m}/\mathrm{it}/10$, the **sansserif** option uses **cmbrmi10** $\backslash\mathrm{OML}/\mathrm{cmbrm}/\mathrm{m}/\mathrm{it}/10$ from the **CMBRIGHT** package [43]. The symbol font 2. of CM is **cmsy10** $\backslash\mathrm{OMS}/\mathrm{cmsy}/\mathrm{m}/\mathrm{n}/10$, and is replaced by LM to be **lmsy10** $\backslash\mathrm{OMS}/\mathrm{lmsy}/\mathrm{m}/\mathrm{n}/10$, the **sansserif** option uses **cmsssy10** $\backslash\mathrm{OMS}/\mathrm{cmsssy}/\mathrm{m}/\mathrm{n}/10$ from the **SANSMATHFONTS** package [24]. The extension font 3. of CM is **cmex10** $\backslash\mathrm{OMX}/\mathrm{cmex}/\mathrm{m}/\mathrm{n}/5$, and is replaced by the **EXSCALE** package [44] to be **cmex10** $\backslash\mathrm{OMX}/\mathrm{cmex}/\mathrm{m}/\mathrm{n}/10$, the **sansserif** option loads **cmssex10** $\backslash\mathrm{OMX}/\mathrm{cmssex}/\mathrm{m}/\mathrm{n}/10$. The **AMSSYMB** (**AMSFONTS**) packages [45] load two more symbol fonts

4. **msam10** $\backslash\mathrm{U}/\mathrm{msa}/\mathrm{m}/\mathrm{n}/10$ AMS symbol font A (special math operators)
5. **msbm10** $\backslash\mathrm{U}/\mathrm{msb}/\mathrm{m}/\mathrm{n}/10$ AMS symbol font B ($\backslash\mathrm{mathbb}$, negated operators)

The **sansserif** option replaces them with **ssmsam10** $\backslash\mathrm{U}/\mathrm{ssmsa}/\mathrm{m}/\mathrm{n}/10$ and **ssmsbm10** $\backslash\mathrm{U}/\mathrm{ssmsb}/\mathrm{m}/\mathrm{n}/10$ from the **SANSMATHFONTS** package [24], respectively. The **BM** package [28] loads the bold version for the fonts 0. to 2..

Other math alphabets are only loaded on demand, *e.g.* $\backslash\mathrm{mathsf}$ uses a sans serif font and $\backslash\mathrm{mathbf}$ without **BM** uses a bold font. The $\backslash\mathrm{mathscr}$ macro uses the script font from the **MATHRSFS** package [46]

9. **rsfs10** $\backslash\mathrm{U}/\mathrm{rsfs}/\mathrm{m}/\mathrm{n}/10$ Math script font (capital letters)

The $\backslash\mathrm{mathbb}$ macro loads the double stroke font from the **DSFONT** package [9], this can be prevented with the **symbols=ams** option.

10. **dsrom10** $\backslash\mathrm{U}/\mathrm{dsrom}/\mathrm{m}/\mathrm{n}/10$ Double stroke font

The $\backslash\mathrm{mathfrak}$ macro loads the fraktur font from the **AMSSYMB** package [45]

11. **eufm10** $\backslash\mathrm{U}/\mathrm{euf}/\mathrm{m}/\mathrm{n}/10$ Math fraktur (Basic Latin)

The **HEP-PAPER** package uses nine of the available 16 math alphabets. This number can be reduced by three using $\backslash\mathrm{newcommand}\{\backslash\mathrm{bmmax}\}\{0\}$ from the **BM** package [28].

The **symbols=minion** option replaces the fonts 2. to 5. with corresponding fonts from the **MNSYMBOL** package [10]. Additionally, two more symbol alphabets are

allocated, the `bm` package [28] loads one more font and now `\mathcal` triggers the use of one additional alphabet. Hence, the `minion` option uses three to four more math alphabets than a usual setup.

B Options

Load the `PDFTEXCMDS` [47] and `KVOPTIONS` [48] 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 [6]. 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}
```

`symbols` Provide the option `symbols` allowing to switch the symbol font.

```
14 \DeclareStringOption[true]{symbols}
```

B.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.

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

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

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

bibliography Provide the option **bibliography** for passing a **style** string to the BIBLATEX package [11] or disabling the automatic loading of **biblatex**.

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

glossaries Provide the option **glossaries** able to turn of the use of the GLOSSARIES package [12].

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

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

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

B.2 Compatibility

beamer Provide the option **beamer** for BEAMER [14] compatibility mode.

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

revtex Provide the option **revtex** for REVTeX [17] compatibility mode.

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

jhep Provide the option **jhep** for JHEP [15] compatibility mode.

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

jcaph Provide the option **jcaph** for JCAP [16] compatibility mode.

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

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

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

B.3 Reactivation

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

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

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

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

B.4 Process options

```
27 \ProcessKeyvalOptions*
```

Read the class options regarding font and paper size.

```
28 \def\hep@get@class#1.cls#2\relax{\def\hep@class{#1}}
29 \def\hep@get@class{\expandafter\hep@get@class\@filelist\relax}
30 \hep@get@class
31 \@ifclasswith{\hep@class}{10pt}{\setkeys{hep}{font=10pt}}{}
32 \@ifclasswith{\hep@class}{12pt}{\setkeys{hep}{font=12pt}}{}
33 \@ifclasswith{\hep@class}{a5paper}{\setkeys{hep}{paper=a5}}{}
34 \@ifclasswith{\hep@class}{b5paper}{\setkeys{hep}{paper=b5}}{}
35 \@ifclasswith{\hep@class}{letterpaper}{\setkeys{hep}{paper=letter}}{}
36 \@ifclasswith{\hep@class}{legalpaper}{\setkeys{hep}{paper=legal}}{}
37 \@ifclasswith{\hep@class}{executivepaper}{%
38   \setkeys{hep}{paper=executive}%
39 }
```

B.5 Set compatibility

Set the `pos` compatibility options.

```
40 \@ifclassloaded{PoS}{\setkeys{hep}{pos}}{}
41 \ifhep@pos
42   \setkeys{hep}{defaults, title=false}
43   \DeclareRobustCommand\boldmath{\@nomath\boldmath\mathversion{bold}}
44 \fi
```

Set the `beamer` compatibility options.

```
45 \@ifclassloaded{beamer}{\setkeys{hep}{beamer}}{}
46 \ifhep@beamer
47   \setkeys{hep}{defaults, title=false, references=false, sansserif}
48   \@ifpackageloaded{beamerbasefont}{\usefonttheme{professionalfonts}}{}
49 \fi
```

Set the `revtex` compatibility options.

```
50 \@ifclassloaded{revtex4}{\setkeys{hep}{revtex}}{}
51 \@ifclassloaded{revtex4-1}{\setkeys{hep}{revtex}}{}
52 \@ifclassloaded{revtex4-2}{\setkeys{hep}{revtex}}{}

```

```

53 \ifhep@revtex
54   \setkeys{hep}{defaults, title=false, bibliography=false, lang=american}
55 \fi

```

Define the SISSA conditional.

```

56 \@ifpackageloaded{jheppub}{\setkeys{hep}{jhep}}{}
57 \@ifpackageloaded{jcapub}{\setkeys{hep}{jcap}}{}
58 \newif\ifhep@sisssa
59 \ifhep@jhep\hep@sisssatrue
60 \else
61   \ifhep@jcap\hep@sisssatrue
62   \else\hep@sissafalse
63   \fi
64 \fi

```

Set the SISSA compatibility options.

```

65 \ifhep@sisssa
66   \setkeys{hep}{title=false, bibliography=false}
67   \PassOptionsToPackage{
68     colorlinks=true, linktocpage=true, pdfproducer=medialab, pdfa=true,
69     urlcolor=blue, anchorcolor=blue, citecolor=blue, filecolor=blue,
70     linkcolor=blue, menucolor=blue, pagecolor=blue
71   }{hyperref}
72   \PassOptionsToPackage{reset}{geometry}
73 \fi

```

Set the JHEP compatibility options.

```

74 \ifhep@jhep
75   \voffset 0in
76   \hoffset 0in
77 \fi

```

C Text

Set the whole text to sans serif if requested.

```

78 \ifhep@serif\else
79   \renewcommand{\familydefault}{\sfdefault}
80 \fi

```

`\ifxetexorluatex` Load the `IFLUATEX` [49] and `IFXETEX` [50] packages. Define the `\ifxetexorluatex` conditional checking if the package is executed by Lua^T_EX or X_Y^T_E_X.

```

81 \RequirePackage{ifluatex}
82 \RequirePackage{ifxetex}
83 \newif\ifxetexorluatex
84 \ifxetex\xetexorluatextrue

```

```

85 \else
86   \ifluatex\etextorluatextrue
87   \else\etextorluatexfalse
88   \fi
89 \fi

```

Pick the correct font encoding depending on the engine used and load the `FON-
TENC` package [51] with this encoding. For details of the font encoding see [52].

```

90 \ifetextorluatex
91   \def\hep@encoding{TU}
92 \else
93   \def\hep@encoding{T1}
94 \fi
95 \RequirePackage[\hep@encoding]{fontenc}

```

Fix the remaining CM fonts [53], load the `Lmodern` font [3], the `textcomp` extension [54], and the `MICROTYPE` font optimization [4].

```

96 \RequirePackage{fix-cm}
97 \RequirePackage{lmodern}
98 \renewcommand{\ttdefault}{lmtt}
99 \RequirePackage{textcomp}
100 \RequirePackage{microtype}

```

Define bold and sans serif small caps font shapes using the `Fontspec` package [55]. The font abbreviations are

lmr LM regular font
lmss LM sans serif font
cmss CM sans serif font
xcmss Extended CM sans serif font (from the `SANSMATHFONTS` package [24])
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

```

101 \ifetextorluatex
102   \RequirePackage{fontspec}
103   \setmainfont{Latin Modern Roman}[
104     UprightFeatures={SmallCapsFont={lmromancaps10-regular.otf}},
105     BoldFeatures={
106       SmallCapsFeatures={Letters=SmallCaps},
107       SmallCapsFont={cmunbx.otf}
108     }
109   ]
110   \DeclareFontShape{\hep@encoding}{lmss}{bx}{sc}{<->cmssbxcsc10}{}
111   \DeclareFontShape{\hep@encoding}{lmss}{b}{sc}{<->cmssbxcsc10}{}
112   \DeclareFontShape{\hep@encoding}{lmss}{m}{sc}{%

```



```

113     <-9>cmsscsc8<9-10>cmsscsc9<10->cmsscsc10%
114   }{}
115 \else
116   \rmfamily
117   \DeclareFontShape{\hep@encoding}{lmr}{b}{sc}{<->ssub*cmr/bx/sc}{}
118   \DeclareFontShape{\hep@encoding}{lmr}{bx}{sc}{<->ssub*cmr/bx/sc}{}
119   \sffamily
120   \DeclareFontShape{\hep@encoding}{lmss}{bx}{sc}{<->ssub*xcms/bx/sc}{}
121   \DeclareFontShape{\hep@encoding}{lmss}{b}{sc}{<->ssub*xcms/bx/sc}{}
122   \DeclareFontShape{\hep@encoding}{lmss}{m}{sc}{<->ssub*xcms/m/sc}{}
123 \fi

```

Load the `INPUTENC` package [56].

```

124 \ifxetexorluatex\else
125   \RequirePackage[utf8]{inputenc}
126 \fi

```

Load the `BABEL` package [6] for hyphenation and the recommended `CSQUOTES` package [20].

```

127 \RequirePackage[\hep@lang]{babel}
128 \RequirePackage{csquotes}

```

`\underline` Load the `ULEM` package [25] for hyphenable underlined text.

```

129 \RequirePackage[normalem]{ulem}
130 \let\underline\uuline

```

C.1 Font size

Undefine previously defined font sizes and load the \LaTeX font size file corresponding to the font size option.

```

131 \ifhep@defaults\else
132   \def\hep@remove@pt#1pt{#1}
133   \edef\hep@pt@size{\expandafter\hep@remove@pt\hep@font}
134   \let\small\relax
135   \let\footnotesize\relax
136   \let\scriptsize\relax
137   \let\tiny\relax
138   \let\large\relax
139   \let\Large\relax
140   \let\LARGE\relax
141   \let\huge\relax
142   \let\Huge\relax
143   \input{size\hep@pt@size.clo}
144 \fi

```

C.2 Text macros

`\vs` Load the `FOREIGN` package [21] in order to highlight abbreviations and vocabularies from foreign languages. Add the missing `\vs` command.

```
145 \ifnum\pdf@strcmp{\hep@lang}{american}=0
146   \newcommand{\hep@lang@foreign}{USenglish}
147 \else
148   \ifnum\pdf@strcmp{\hep@lang}{USenglish}=0
149     \newcommand{\hep@lang@foreign}{USenglish}
150   \else
151     \newcommand{\hep@lang@foreign}{british}
152   \fi
153 \fi
154 \RequirePackage{all, \hep@lang@foreign}{foreign}
155 \DeclareRobustCommand\vs{\xperiodafter{\foreignabbrfont{vs}}}
```

The `FOREIGN` package relies on the `XSPACE` package [57]. Ensure that `\xspace` is compatible with the `\enquote` macro from the `CSQUOTE` package.

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

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

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

`\software` Define a macro for software with optional version information `\software{⟨version⟩}[⟨name⟩]`, using the `RELSIZE` package [58].

```
158 \RequirePackage{relsize}
159 \newcommand{\software}[2][\hspace{-\fontdimen2\font}]{%
160   {\smaller\textsc{#2}~#1}%
161 }
```

`\online` Define the `\online{⟨text⟩}{⟨url⟩}` macro combining the features of the `\href` and the `\email` `\url` macros. Define a macro for typesetting emails.

```
162 \newcommand{\online}[2]{\href{#1}{\nolinkurl{#2}}}
163 \newcommand{\email}[1]{\online{mailto:#1}{#1}}
```

`\prefix` Define the `\prefix{⟨prefix⟩}{⟨word⟩}` macro ensuring the correct linebreak in (prefix-) word.

```
164 \newcommand{\prefix}[2]{(#1\mbox{-})\allowbreak #2}
```

C.3 Lists

Load the `ENUMITEM` package [23].

```
165 \RequirePackage[inline]{enumitem}
```

`inlinelist` Define an inline list environment.

```
166 \newlist{inlinelist}{enumerate*}{1}
167 \setlist*{inlinelist,1}{%
168   label=\roman*), itemjoin={,\ }, itemjoin*={, and\ }, after=.%
169 }
```

`enumdescript` Define an enumdescript list environment.

```
170 \newlist{enum@descript}{enumerate}{2}
171 \setlist[enum@descript]{label=\arabic*.*}
172 \newenvironment{enumdescript}[1][]{
173 \begin{enum@descript}[#1]
174   \let\hep@item\item
175   \renewcommand{\item}[2][]{
176     \ifx&##1&\hep@item\else\hep@item[##1]\fi
177     \textbf{##2}\ifx##2\empty\else~\fi\@ifnextchar\par\@gobble\relax
178   }
179 }\end{enum@descript}}
```

D Geometry

Load the `GEOMETRY` package [2] and adjust the text width and height. This step must happen after readjusting the font size in appendix C.1.

```
180 \ifhep@defaults\else
181   \RequirePackage{geometry}
182   \geometry{%
183     \hep@paper paper,
184     hscale=.75,
185     vscale=.8,
186     vmarginratio=3:4,
187     includeheadfoot
188   }
189 \fi
```

`\useparskip` Load the `PARSKIP` package [7] if requested and provide two commands switching
`\useparindent` between the two paragraph modes.

```
190 \ifhep@parindent\else
191 \RequirePackage{parskip}
192 \newcommand{\useparskip}{%
193   \setlength{\parskip}{.5\baselineskip plus 2pt}%
194   \setlength{\parindent}{0pt}%
195 }
196 \newcommand{\useparindent}{%
197   \setlength{\parskip}{0pt}%
198   \setlength{\parindent}{15pt}%
199   \if@twocolumn\setlength\parindent{1em}
200   \else\setlength\parindent{1.5em}
```

```

201 \fi
202 }
203 \fi

```

E Math

Load the `MATHTOOLS` package [26] which loads the `AMSMATH` package [27]. Allow page breaks within equations if necessary.

```

204 \RequirePackage{mathtools}
205 \allowdisplaybreaks[1]

```

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

```

\sgn
206 \DeclareMathOperator{\diag}{diag}
207 \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 [59].

```

208 \RequirePackage{xparse}
209 \DeclareDocumentCommand{\mathdef}{m0{0}m}{%
210   \expandafter\let\csname text\string#1\endcsname=#1
211   \expandafter\newcommand\csname math\string#1\endcsname[#2]{#3}
212   \DeclareRobustCommand#1{%
213     \ifmmode
214       \expandafter\let\expandafter\next\csname math\string#1\endcsname
215     \else
216       \expandafter\let\expandafter\next\csname text\string#1\endcsname
217     \fi
218     \next
219   }%
220 }

```

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

```

221 \AtBeginDocument{\mathdef{\i}{\operatorname{i}}}

```

`\overline` Redefine `\overline` to be a text macro using the `ULEM` package [25]. Extend it as a math macro with the original definition from the `AMSMATH` package [27].

```

222 \def\overline#1{{\renewcommand{\ULdepth}{-1.9ex}}{\uline{#1}}}
223 \DeclareRobustCommand{\over@line}[1]{\@@overline{#1}}
224 \mathdef{\overline}{\over@line}

```

`\left` Load the `MLEFTRIGHT` package [60] and adjust the spacing around `\left` and `\right`.

```

\right
225 \RequirePackage{mleftright}
226 \mleftright

```

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

```
227 \ifhep@eqnarray\else
228   \let\eqnarray\@undefined
229   \let\endeqnarray\@undefined
230 \fi
```

E.1 Math fonts

Define conditionals based on the `symbols` package option.

```
231 \newif\ifhep@symbols
232 \ifnum\pdf@strcmp{\hep@symbols}{false}=0\else\hep@symbolstrue\fi
233 \newif\ifhep@ams
234 \ifnum\pdf@strcmp{\hep@symbols}{ams}=0 \hep@amstrue\fi
235 \newif\ifhep@minion
236 \ifnum\pdf@strcmp{\hep@symbols}{minion}=0 \hep@miniontrue\fi
```

Load the `fixmath` [30] and `ALPHABETA` [31] packages ensuring that upper Greek letters in math mode are italic and providing upright Greek letters in text mode, respectively.

```
237 \ifhep@symbols
238   \RequirePackage{alphabeta}
239   \RequirePackage{fixmath}
```

Either load the `MNSYMBOL` package [10] or the the `EXSCALE` package in order to fix Latin Modern `lmex` fonts. Additionally, load the `AMSSYMB` package [8] which provides further math symbols and also loads the `AMSFONTS` package [8].

```
240   \ifhep@minion
241     \RequirePackage{MnSymbol}
242   \else
243     \RequirePackage{exscale}
244     \RequirePackage{amssymb}
245   \fi
246 \fi
```

`\mathsf` If the `sansserif` package option is active use the `CMBRIGHT` font [43] and code adjusted from the `SANSMATHFONTS` package [24]. Ensure that `\mathsf` is italic as well as sans serif and sans for sans and sans serif documents, respectively.

```
247 \ifhep@serif
248   \newcommand\hep@font@sf{cmbrm}
249   \DeclareMathAlphabet{\mathsf}{OML}{\hep@font@sf}{m}{it}
250   \SetMathAlphabet{\mathsf}{bold}{OML}{\hep@font@sf}{b}{it}
251 \else
252   \newcommand\hep@font@sf{lmr}
253   \newcommand\hep@font@text{lmss}
254   \newcommand\hep@font@math{cmbrm}
255   \newcommand\hep@font@symbol{cmsssy}
```

```

256 \newcommand\hep@font@extra{cmssex}
257 \newcommand\hep@font@amsa{ssmsa}
258 \newcommand\hep@font@amsb{ssmsb}

```

Declare font substitutions.

```

259 \DeclareFontSubstitution{OML}{\hep@font@math}{m}{it}
260 \ifhep@symbols\ifhep@minion\else
261   \DeclareFontSubstitution{OMS}{\hep@font@symbol}{m}{n}
262   \DeclareFontSubstitution{OMX}{\hep@font@extra}{m}{n}
263 \fi\fi

```

Declare the symbol fonts.

```

264 \DeclareSymbolFont{operators}{OT1}{\hep@font@text}{m}{n}
265 \DeclareSymbolFont{letters}{OML}{\hep@font@math}{m}{it}
266 \ifhep@symbols\ifhep@minion\else
267   \DeclareSymbolFont{symbols}{OMS}{\hep@font@symbol}{m}{n}
268   \DeclareSymbolFont{largesymbols}{OMX}{\hep@font@extra}{m}{n}
269 \fi\fi

```

Set bold symbol fonts.

```

270 \SetSymbolFont{operators}{bold}{OT1}{\hep@font@text}{b}{n}
271 \SetSymbolFont{letters}{bold}{OML}{\hep@font@math}{b}{it}
272 \ifhep@symbols\ifhep@minion\else
273   \SetSymbolFont{symbols}{bold}{OMS}{\hep@font@symbol}{b}{n}
274 \fi\fi

```

Adjust the fonts loaded by the AMSFONTS [8] and ESINT [61] packages.

```

275 \ifhep@symbols\ifhep@minion\else
276   \DeclareSymbolFont{AMSA}{U}{\hep@font@amsa}{m}{n}
277   \DeclareSymbolFont{AMSB}{U}{\hep@font@amsb}{m}{n}
278 \fi\fi
279 \AtBeginDocument{%
280   \@ifpackageloaded{esint}{%
281     \DeclareSymbolFont{largesymbolsA}{U}{ssesint}{m}{n}
282   }{}
283 }

```

Declare the symbol font alphabets.

```

284 \DeclareSymbolFontAlphabet{\mathrm}{operators}
285 \DeclareSymbolFontAlphabet{\mathnormal}{letters}
286 \ifhep@minion\else
287   \DeclareSymbolFontAlphabet{\mathcal}{symbols}
288 \fi

```

Declare `\mathit`.

```

289 \DeclareMathAlphabet{\mathit}{OML}{\hep@font@text}{m}{it}
290 \SetMathAlphabet{mathit}{bold}{OML}{\hep@font@text}{bx}{it}

```

Declare `\mathtt`.

```
291 \DeclareMathAlphabet{\mathtt}{OT1}{cmtl}{m}{n}
```

Declare `\mathsf`.

```
292 \DeclareMathAlphabet{\mathsf}{OML}{\hep@font@sf}{m}{it}
293 \SetMathAlphabet{\mathsf}{bold}{OML}{\hep@font@sf}{bx}{it}
```

End of `sansserif`.

```
294 \fi
```

`\mathbf` Load the `bm` package [28] for superior boldmath. Make math symbols bold whenever they appear in bold macros such as `\section{<text>}`.

```
295 \ifhep@symbols
296 \RequirePackage{bm}
297 \AtBeginDocument{\let\mathbf\bm}
298 \g@addto@macro\bfseries{\boldmath}
```

`\mathscr` Provide the `\mathscr` math script font from the `MATHRSFS` package [46].

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

`\mathbb` Redefine the the `\mathbb` math blackboard style font according to the (sans-)serif option with the font from the `DSFONT` package [9].

```
300 \ifhep@minion
301 \DeclareMathAlphabet{\mathbb}{U}{%
302 \ifhep@serif dsrom\else dsss\fi%
303 }{m}{n}
304 \else
305 \ifhep@ams\else
306 \SetMathAlphabet{\mathbb}{normal}{U}{%
307 \ifhep@serif dsrom\else dsss\fi%
308 }{m}{n}
309 \fi
310 \fi
311 \fi
```

E.2 Physics notation

`\cancel` Load the `PHYSICS` package [32] which provides macros useful for publications in physics. Additionally, load the `CANCEL` [33] and `SLASHED` [34] packages which provide the `\cancel` and `\slashed` macros. Finally, load the `UNITS` package [35] which provides the `\units` and `\nicefrac` macros.

```
312 \RequirePackage{physics}
```

```

313 \RequirePackage{cancel}
314 \RequirePackage{slashed}
315 \RequirePackage{units}

```

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

```

316 \newcommand{\inv}[2][1]{#2\ensuremath{\sim^{-#1}}}

```

`\d` Provide a differential `\d`.

```

317 \AtBeginDocument{\mathdef{\d}{\dd}}

```

`\oset` Define a new overset macro `\oset[⟨offset⟩]{⟨over⟩}{⟨base⟩}`

```

318 \newcommand{\oset}[3][-1pt]{%
319   \raisebox{1pt}{\ensuremath{\mathop{#3}\limits^{%
320     \vbox to#1{\kern-2\ex@\hbox{$\scriptscriptstyle#2$}\vss}%
321   }}}}%
322 }

```

`\overleftrighth` Define a over left right arrow `\overleftrighth{⟨base⟩}`.

```

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

```

F Floats

Adjust the L^AT_EX float placement defaults

```

324 \setcounter{bottomnumber}{0} % 1
325 \setcounter{topnumber}{1} % 2
326 \setcounter{dbltopnumber}{1} % 2
327 \renewcommand{\topfraction}{.9} % .7
328 \renewcommand{\dbltopfraction}{.9} % .7
329 \renewcommand{\textfraction}{.1} % .2
330 \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.

```

331 \let\@figure@\figure%
332 \let\@end@figure@\endfigure%
333 \let\@table@\table%
334 \let\@end@table@\endtable%
335 \ifhep@manualplacement%
336   \renewenvironment{figure}[1][tbp]{%
337     \@figure@[#1]\centering%
338   }{\@end@figure@}%
339   \renewenvironment{table}[1][tbp]{%

```



```

340     \@table@[#1]\centering%
341   }\@end@table@}%
342 \else%
343   \renewenvironment{figure}[1][]{%
344     \@figure@\centering%
345   }\@end@figure@}%
346   \renewenvironment{table}[1][]{%
347     \@table@\centering%
348   }\@end@table@}
349 \fi%

```

F.1 Sub-floats

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

```

350 \newif\ifhep@journal
351 \ifhep@sissa\hep@journaltrue
352 \else
353   \ifhep@revtex\hep@journaltrue
354   \else
355     \ifhep@pos\hep@journaltrue
356     \else\hep@journalfalse
357   \fi
358 \fi
359 \fi

```

Prevent the `CAPTION` package [62] from complaining about the journal classes and packages.

```

360 \ifhep@journal
361   \setlength\abovecaptionskip{\f@size\p@}
362   \setlength\belowcaptionskip{0\p@}
363   \long\def\@makecaption#1#2{%
364     \vskip\abovecaptionskip
365     \sbox\@tempboxa{#1: #2}%
366     \ifdim \wd\@tempboxa >\hsize
367       #1: #2\par
368     \else
369       \global \@minipagefalse
370       \hb@xt@\hsize{\hfil\box\@tempboxa\hfil}%
371     \fi
372     \vskip\belowcaptionskip%
373   }
374 \fi

```

Load the `SUBCAPTION` package [36]. Provide the old `\subcaption@minipage` macro.

```

375 \RequirePackage[subrefformat=parens]{subcaption}
376 \captionsetup{font=small}
377 \captionsetup[sub]{font=small}
378 \providecommand*\subcaption@minipage[2]{%

```

```

379 \minipage#1{#2}\setcaptionsubtype\relax%
380 }

```

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

`\panel`

```

381 \newenvironment{panels}[2][b]{%

```

Define an internal macro for global behaviour.

```

382 \newcommand{\begin@subcaption@minipage}[2][b]{%
383 \caption@withoptargs\subcaption@minipage[##1]{##2}%
384 \centering\vskip 0pt%
385 }

```

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

```

386 \ifdim#2pt>1pt%
387 \newcommand{\panel}[1][b]{%
388 \endminipage\hfill\begin@subcaption@minipage[#1]{\linewidth/#2}%
389 }%
390 \begin@subcaption@minipage[#1]{\linewidth/#2}%

```

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

```

391 \else%
392 \newcommand{\panel}[2][b]{%
393 \endminipage\hfill\begin@subcaption@minipage[#1]{##2\linewidth}%
394 }%
395 \begin@subcaption@minipage[#1]{#2\linewidth}%
396 \fi%
397 }\endminipage}

```

Reajust the captions to the `revtex` class using the `RAGGED2E` package [63].

```

398 \ifhep@revtex
399 \RequirePackage{ragged2e}
400 \DeclareCaptionFormat{revtex}{#1#2\justifying{#3}}
401 \captionsetup{font=small, format=revtex}
402 \captionsetup[sub]{font=footnotesize, format=plain}
403 \renewcommand{\figurename}{Figure}
404 \renewcommand{\tablename}{Table}
405 \fi

```

F.2 Tables

tabular Enhance tabulars with the `BOOKTABS` and `MULTIROW` packages [37, 38].

```

406 \RequirePackage{booktabs}
407 \RequirePackage{multirow}

```

F.3 Figures

`\graphic` Provide the `\graphic` macro for the inclusion of figures using the `GRAPHICX` package [39].

```
408 \RequirePackage{graphicx}
409 \providecommand{\tikzsetnextfilename}[1]{}
410 \newcommand{\graphic}[2][1]{\tikzsetnextfilename{#2}{%
411   \centering\includegraphics[width=#1\linewidth]{#2}\par%
412 }}
```

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

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

G Title page

Begin of title conditional.

```
414 \ifhep@title
```

`\date` Allow absent date field.

```
415 \date{}
```

G.1 Titles

Extend the title using the `TITLING` package [18].

```
416 \RequirePackage{titling}
```

`\preprintfont` Allow to change the fontface of the individual parts of the title.

```
  \titlefont
  \subtitlefont
  \authorfont
\affiliationfont
  \datefont
417 \let\hep@preprint@font\relax
418 \newcommand{\preprintfont}[1]{\def\hep@preprint@font{#1}}
419 \let\hep@title@font\relax
420 \newcommand{\titlefont}[1]{\def\hep@title@font{#1}}
421 \let\hep@subtitle@font\relax
422 \newcommand{\subtitlefont}[1]{\def\hep@subtitle@font{#1}}
423 \let\hep@author@font\relax
424 \newcommand{\authorfont}[1]{\def\hep@author@font{#1}}
425 \let\hep@affiliation@font\relax
426 \newcommand{\affiliationfont}[1]{\def\hep@affiliation@font{#1}}
427 \let\hep@date@font\relax
428 \newcommand{\datefont}[1]{\def\hep@date@font{#1}}
```

`\subtitle` Define a subtitle.

```
429 \newcommand{\presubtitle}[1]{\def\hep@pre@sub@title{#1}}
430 \newcommand{\subtitle}[1]{\def\sub@title{#1}}
```

```

431 \newcommand{\postsubtitle}[1]{\def\hep@post@sub@title{#1}}
432 \renewcommand{\maketitlehookb}{%
433   \ifundefined{sub@title}{}%
434     \hep@pre@sub@title\sub@title\hep@post@sub@title%
435   }%
436 }

```

Set standard values mostly taken from the `TITLING` package, add the font hook, and reduce the `date` font size.

```

437 \pretitle{\begin{center}\LARGE\hep@title@font}
438 \posttitle{\par\end{center}}
439 \presubtitle{\begin{center}\large\hep@subtitle@font}
440 \postsubtitle{\par\end{center}}
441 \preauthor{%
442   \begin{center}\large\hep@author@font\lineskip.5em\begin{tabular}[t]{c}%
443 }
444 \postauthor{\end{tabular}\par\end{center}}
445 \predate{\begin{center}\hep@date@font}
446 \postdate{\par\end{center}}

```

G.2 Authors

`\author` Allow absent author field. Enable the handling of multiple authors with different affiliations using the `AUTHBLK` package [19].

```

447 \author{}
448 \RequirePackage{authblk}
449 \renewcommand{\Affilfont}{\small\hep@affiliation@font}
450 \renewcommand\Authfont{\hep@author@font}

```

`\email` Redefine the email macro to place the email address in a footnote if called from within the `\author` macro `\author{\langle name \rangle \email{\langle email \rangle}}`.

```

451 \let\hep@author\author
452 \def\author{%
453   \renewcommand{\email}[1]{\unskip\thanks{\online{mailto:##1}{##1}}}%
454   \hep@author
455 }

```

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

```

456 \newcommand\hep@active@comma{,\penalty-5\relax}
457 \newcommand\hep@cat@comma@active{\catcode'\,\active}
458 {\hep@cat@comma@active\gdef,{\hep@active@comma}}
459 \newcommand\hep@affil[1]{%
460   \endgroup\@flushglue=0pt plus .5\linewidth\affil{#1}%
461 }
462 \def\hep@affil@opt[#1]#2{%
463   \endgroup\@flushglue=0pt plus .5\linewidth\affil[#1]{#2}%

```

```

464 }
465 \DeclareRobustCommand\hep@affiliation{%
466   \ifnextchar[{\hep@affil@opt}{\hep@affil}%
467 }
468 \newcommand{\affiliation}{%
469   \begingroup\hep@cat@comma@active\hep@affiliation%
470 }

```

G.3 Preprint

`\preprint` Define the `\preprint` macro using the `VARWIDTH` package [64].

```

471 \let\hep@preprint\relax
472 \newcommand\preprint[1]{\def\hep@preprint{#1}}
473 \RequirePackage{varwidth}
474 \newcommand{\hep@preprint@box}{%
475   \begin{varwidth}{\textwidth}%
476     \small\hep@preprint@font\hep@preprint%
477   \end{varwidth}%
478 }
479 \preprintfont{\sc}

```

`\placepreprint` Places a preprint number in the top right corner of the title page using the `AT-BEGSHI` [65] and `PICTURE` [66] packages.

```

480 \RequirePackage{atbegshi}
481 \RequirePackage{picture}
482 \newcommand{\placepreprint}{%
483   \AtBeginShipoutFirst{%
484     \put(
485       \textwidth+\oddsidemargin-\widthof{\hep@preprint@box},
486       -2pt-\topmargin-\heightof{\hep@preprint@box}
487     ){\normalfont\hep@preprint@box}
488   }
489 }
490 \renewcommand{\maketitlehooka}{\placepreprint\vspace{-\bigskipamount}}

```

G.4 Abstract

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

```

491 \@ifundefined{abstract}{}{%
492   \let\hep@abstract\abstract%
493   \renewcommand\abstract{\hep@abstract\noindent\ignorespaces}%
494 }

```

End of title conditional.

```

495 \fi

```

H Bibliography

Check if bibliography management is requested.

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

`\bibliography` Load the BIBLATEX package [11] with the datamodel defined in appendix K.

```
497 \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.

```
498 \providecommand{\DeclareSortingTemplate}{\DeclareSortingScheme}
499 \DeclareSortingTemplate{hep-paper}{
500   \sort{\citeorder}
501   \sort[final]{\field{sortkey}}
502   \sort{\field{sortyear} \field{year} \literal{9999}}
503   \sort{\field{month}}
504   \sort{\field{eprint} \field{doi}}
505   \sort{\field{sorttitle} \field{title}}
506   \sort{\field{subtitle} \field{volume}}
507 }
```

Use the new sorting scheme and abbreviat all first names.

```
508 \ExecuteBibliographyOptions{
509   sorting=hep-paper,
510   giveninits=true
511 }
```

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

```
512 \NewBibliographyString{erratum,erratums}
513 \DefineBibliographyStrings{english}{erratum={Erratum},erratums={Errata}}
514 \providecommand{\relateddelimerratum}{\addsemicolon\space}
```

`\printbibliography` Allow the bibliography to be printed sloppy

```
515 \let\hep@printbibliography\printbibliography
516 \renewcommand{\printbibliography}{\sloppy\hep@printbibliography}
```

H.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
517 \newcommand{\reg@exp@one}{\regexp{\A(\p{L}+)?\d+(\p{L}+)?\Z}}
518 \newcommand{\reg@exp@two}{\regexp{\A(\p{L}+)?(\d+)(\p{L}+)?\Z}}
```

```

519 \newcommand{\reg@exp@url}{\regexp{\A(ht|f)tp(s)?:\/\|}}
520 \newcommand{\reg@exp@pmc}{\regexp{\A(PMC)?}}

```

`\DeclareSourcemap` Use the `\DeclareSourcemap` feature.

```

521 \DeclareSourcemap{%
522   \maps[datatype=bibtex, overwrite=true]{%

```

`collaboration` Read the collaboration information if present.

```

523     \map{%
524       \step[fieldsource=Collaboration, final=true]%
525       \step[fieldset=collaboration, origfieldval, final=true]
526     }%

```

`reportnumber` Read the pre-print information if present.

```

527     \map{%
528       \step[fieldsource=reportNumber, final=true]%
529       \step[fieldset=reportnumber, origfieldval, final=true]
530     }%

```

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

```

531     \map[overwrite]{
532       \step[fieldsource=volume, match=\reg@exp@one, final]
533       \step[fieldsource=volume, match=\reg@exp@two, replace={$2}]
534       \step[fieldsource=journal, fieldtarget=journaltitle]
535       \step[fieldset=journaltitle, fieldvalue={\space$1$2}, append=true]
536     }

```

`url` Remove the protocol from URL.

```

537     \map{
538       \step[fieldsource=url, final=true]
539       \step[fieldset=protocollessurl, origfieldval, final=true]
540       \step[fieldsource=protocollessurl, match=\reg@exp@url, replace={}]
541     }

```

`pmc` Remove the PMC from the PMCID.

```

542     \map{
543       \step[fieldsource=pmcid, final=true]
544       \step[fieldset=pmc, origfieldval, final=true]
545       \step[fieldsource=pmc, match=\reg@exp@pmc, replace={}]
546     }
547   }%
548 }

```

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

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

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

```
550 \renewbibmacro*{author/translator+others}{%
551   \ifboolexpr{
552     test \ifuseauthor and (
553       not test {\ifnameundef{author}} or
554       not test {\iffieldundef{collaboration}}
555     )
556   }
557   {\usebibmacro{author}}
558   {\usebibmacro{translator+others}}
559 }
560 \letbibmacro{hep@bib@author}{author}
561 \renewbibmacro*{author}{%
562   \iffieldundef{collaboration}{%
563     \usebibmacro{hep@bib@author}}{\textit{\printfield{collaboration}}}%
564   }%
565 }
```

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

```
566 \renewbibmacro*{in:}{%
567   \iffieldundef{journaltitle}{\printtext{\bibstring{in}\intitlepunct}}%
568 }
```

`url` Show URLs without the protocol.

```
569 \DeclareFieldFormat{url}{%
570   \mkbibacro{URL}\addcolon\space\online{#1}{\thefield{protocollessurl}}%
571 }
```

`\bib@online` Private `\bib@online` macro

```
572 \newcommand{\bib@online}[2]{%
573   \ifhyperref{\online{#1}{#2}}{\nolinkurl{#2}}%
574 }
```

`pmid` Present PubMed IDs.

`pmcid`

```
575 \DeclareFieldFormat{pmid}{%
576   \mkbibacro{PM}\addcolon\space%
577   \bib@online{https://www.ncbi.nlm.nih.gov/pubmed/#1}{#1}%
578 }
579 \DeclareFieldFormat{pmc}{%
580   \mkbibacro{PMC}\addcolon\space%
```



```

581 \bib@online{https://www.ncbi.nlm.nih.gov/pmc/articles/PMC#1}{#1}%
582 }

```

```

pmcid Add the pre-print and PubMed information if present.
pmid
reportnumber
583 \letbibmacro{hep-doi+eprint+url}{doi+eprint+url}
584 \renewbibmacro*{doi+eprint+url}{%
585 \usebibmacro{hep-doi+eprint+url}
586 \iffieldundef{pmc}{%
587 \iffieldundef{pmid}{}{\printfield{pmid}\newunit}%
588 }{\printfield{pmc}\newunit}
589 \iffieldundef{reportnumber}{}{%
590 \newunitpunct\textnumero\intitlepunct%
591 \textsc{\small\printfield{reportnumber}}}%
592 \newunit%
593 }%
594 }

```

H.2 Eprints

\new@eprint Private \new@eprint macro

```

595 \NewDocumentCommand{\new@eprint}{smm}{
596 \DeclareFieldFormat{eprint:#2}{%
597 \newcommand{\@path}{\IfBooleanT{#1}{\thefield{eprintclass}}/##1}%
598 #2\addcolon\space\bib@online{#3/\@path}{\@path}%
599 }%
600 }

```

CTAN Add CTAN as a eprint option

```

601 \new@eprint{CTAN}{https://ctan.org/pkg}
602 \DeclareFieldAlias{eprint:ctan}{eprint:CTAN}

```

GitHub Add GitHub as a eprint option

```

603 \new@eprint*{GitHub}{https://github.com}
604 \DeclareFieldAlias{eprint:github}{eprint:GitHub}

```

GitLab Add GitLab as a eprint option

```

605 \new@eprint*{GitLab}{https://gitlab.com}
606 \DeclareFieldAlias{eprint:gitlab}{eprint:GitLab}

```

Bitbucket Add Bitbucket as a eprint option

```

607 \new@eprint*{Bitbucket}{https://bitbucket.org}
608 \DeclareFieldAlias{eprint:bitbucket}{eprint:Bitbucket}

```

Launchpad Add Launchpad as a eprint option

```
609 \new@eprint{Launchpad}{https://launchpad.net}
610 \DeclareFieldAlias{eprint:launchpad}{eprint:Launchpad}
```

SourceForge Add SourceForge as a eprint option

```
611 \new@eprint{SourceForge}{https://sourceforge.net/projects}
612 \DeclareFieldAlias{eprint:launchpad}{eprint:SourceForge}
```

HEPForge Add HEPForge as a eprint option

```
613 \DeclareFieldFormat{eprint:hepforge}{%
614   HEPForge\addcolon\space\bib@online{https://#1/hepforge.org}{#1}%
615 }
616 \DeclareFieldAlias{eprint:HEPForge}{eprint:hepforge}
```

End check for bibliography option.

```
617 \fi
```

I Hyperlinks, Footnotes and References

Load the `HYPERRREF` package [5] enable Unicode encoding and hide links.

```
618 \RequirePackage{hyperref}
619 \hypersetup{
620   pdfencoding=auto, psdextra,
621   hidelinks, linktoc=all, breaklinks=true,
622   pdfcreator={}, pdfproducer={}
623 }
```

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

```
624 \pdfstringdefDisableCommands{\def\varepsilon{\textepsilon}}
625 \AtBeginDocument{
626   \pdfstringdefDisableCommands{\let\ensuremath@gobble}
627   \pdfstringdefDisableCommands{\let\mathsurround@gobble}
628   \pdfstringdefDisableCommands{\let\unskip@gobble}
629   \pdfstringdefDisableCommands{\let\thanks@gobble}
630   \pdfstringdefDisableCommands{\let\footnote@gobble}
631   \pdfstringdefDisableCommands{\let\\\@gobble}
632 }
633 \ifhep@revtex
634   \AtBeginShipout{\hypersetup{pdftitle={\@title}}}
635 \else
636   \ifhep@beamer\else
637     \AtBeginDocument{\hypersetup{pdftitle={\@title}}}
638   \fi
```

```

639 \fi
640 \ifhep@title
641   \AtBeginDocument{\hypersetup{pdfauthor=\AB@authlist}}
642 \else
643   \ifhep@beamer\else
644     \AtBeginDocument{\hypersetup{pdfauthor={\@author}}}}
645 \fi
646 \fi

```

I.1 Footnotes

Place a hyperlink from the footnote back to its referencing label using the FOOTNOTE-BACKREF package [67].

```

647 \def\BackrefFootnoteTag{}
648 \RequirePackage{footnotebackref}

```

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

```

649 \let\@foot@note\footnote
650 \renewcommand{\footnote}[1]{\unskip\@foot@note{\ignorespaces#1}}

```

I.2 References

Begin of references conditional

```

651 \ifhep@references

```

`\cref` Improve reference using the CLEVEREF package [13].

```

652 \RequirePackage[noabbrev, nameinlink]{cleveref}
653 \newcommand{\creflastconjunction}{, and\nobreakspace}
654 \crefname{enumi}{point}{points}
655 \crefname{inlinelisti}{point}{points}

```

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

```

656 \newcommand\no@break@before{%
657   \relax\ifvmode\else%
658     \ifhmode%
659       \ifdim\lastskip > 0pt%
660         \relax\unskip\nobreakspace%
661       \fi%
662     \fi%
663 \fi%
664 }

```

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

```

665 \let\hep@ref\ref
666 \AtBeginDocument{\renewcommand\ref{\no@break@before\hep@ref}}

```

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

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

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

```
668 \let\hep@subref\subref
669 \renewcommand\subref{\no@break@before\hep@subref}
670 \renewcommand*\subcaption@ref[2]{\begingroup%
671   \caption@setoptions{sub}%
672   \subcaption@reffmt\p@subref{\hep@ref#1{sub@#2}}%
673 \endgroup}
```

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

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

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

```
675 \NewDocumentCommand{\eqcrefname}{mmo}{
676   \crefname{#1}{#2}{\IfValueTF{#3}{#3}{#2s}}
677   \creflabelformat{#1}{(##2##1##3)}
678 }
```

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

```
679 \DeclareRobustCommand{\labelcrefrange}[2]{%
680   \@crefrangenostar{labelcref}{#1}{#2}%
681 }
```

End of references conditional

```
682 \fi
```

I.3 Citations

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

```
683 \let\hep@cite\cite
684 \renewcommand\cite{\no@break@before\hep@cite}
```

Begin of bibliography if.

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

Define bibstrings for reference names.

```
686 \NewBibliographyString{refname}
687 \NewBibliographyString{refsname}
688 \DefineBibliographyStrings{english}{%
```

```

689   refname = {reference},
690   refsname = {references}
691 }

\ccite Define clever citation macros.
\Ccite
692 \DeclareCiteCommand{\ccite}{%
693   \ifnum\thecitetotal=1
694     \bibstring{refname}%
695   \else%
696     \bibstring{refsname}%
697   \fi%
698   \addnbspace\bibopenbracket%
699   \usebibmacro{cite:init}\usebibmacro{prenote}%
700 }{\usebibmacro{cite:index}\usebibmacro{cite:comp}}{}{}%
701   \usebibmacro{cite:dump}\usebibmacro{postnote}%
702   \bibclosebracket%
703 }
704
705 \newrobustcmd*{\Ccite}{\bibsentence\ccite}

End of biblatex if.

706 \fi

```

J Acronyms

Acronyms are implemented with the GLOSSARIES-EXTRA package [68] which is an extension of the GLOSSARIES package [12] and must be loaded after the HYPERREF package in appendix I.

```

707 \ifhepglossaries
708 \RequirePackage[nostyles]{glossaries-extra}

```

The entry count feature is used.

```

709 \glsenableentrycount
710 \glssetcategoryattribute{abbreviation}{entrycount}{1}

```

Provide macros for older glossaries-extra installations.

```

711 \providecommand{\glstrusefield}[2]{\@gls@entry@field{#1}{#2}}
712 \providecommand{\glstrsetfieldifexists}[3]{\glsdoifexists{#1}{#3}}
713 \providecommand{\glsXtrSetField}[3]{%
714   \glstrsetfieldifexists{#1}{#2}{%
715     \csgdef{glo@glsdetoklabel{#1}@#2}{#3}%
716   }%
717 }

```

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

```

718 \glsssetcategoryattribute{abbreviation}{nohyperfirst}{true}
719 \renewcommand*{\glsdonohyperlink}[2]{\{%
720   \glsxtrprotectlinks\edef\fieldvalue{%
721     \glsxtrusefield{\glslabel}{hastarget}}%
722   }%
723   \ifdefstring\fieldvalue{true}{#2}{%
724     \gGlsXtrSetField{\glslabel}{hastarget}{true}%
725     \glsdohypertarget{#1}{#2}%
726   }%
727 }}

```

`\begin@sentence` Mark the beginning of a paragraph as if it would follow a full stop using the `EVERY-HOOK` package [69].

```

728 \RequirePackage[excludeor]{everyhook}
729 \newcommand{\begin@sentence}{1001}
730 \PushPostHook{par}{\spacefactor=\begin@sentence}}

```

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

```

731 \def\frenchspacing{%
732   \sfcode'\.\begin@sentence \sfcode'\?\begin@sentence
733   \sfcode'\!\begin@sentence \sfcode'\:\begin@sentence
734   \sfcode'\;\@m \sfcode'\,\@m
735 }

```

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

```

736 \newcommand{\if@begin@of@sentence}[2]{\leavevmode\protecting{%
737   \ifboolexpr{ test {\ifnumcomp{\spacefactor}{=}{3000}} or%
738               test {\ifnumcomp{\spacefactor}{=}{2000}} or%
739               test {\ifnumcomp{\spacefactor}{=}{\begin@sentence}}}%
740   }{#1}{#2}%
741 }}

```

`\acronym` The `\acronym*[\typeset abbreviation]{\langle abbreviation \rangle*{\langle definition \rangle}[\langle plural definition \rangle]}` 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 \TeX default for space after text macros
 #5 mandatory long form
 #6 optional plural long form

```

742 \NewDocumentCommand{\acronym}{somsmo}{
743   \newabbreviation[

```

```

744     type=\acronymtype,
745     sort=#3,
746     \glsshortpluralkey=\IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}},
747     longplural=\IfNoValueTF{#6}{#5s}{#6}
748 ]{#3}{\IfNoValueTF{#2}{#3}{#2}}{#5}

```

Provide the singular acronym macro.

```

749 \expandafter\newcommand\csname#3\endcsname{%
750   \if@begin@of@sentence{%
751     \ifglused{#3}{\cgl{s}{#3}}{\cGls{#3}}%
752   }{\cgl{s}{#3}}%
753   \ifnum\gl{sentrycurr}{count}{#3}>1\relax
754     \IfBooleanTF{#4}{\@xspace}%
755   \else\@xspace\fi
756 }

```

Expand the singular acronym macro in PDF labels.

```

757 \pdfstringdefDisableCommands{\expandafter\def\csname#3\endcsname{%
758   \IfNoValueTF{#2}{#3}{#2} }%
759 }

```

Provide the singular acronym macro in math mode.

```

760 \expandafter\mathdef\csname#3\endcsname{%
761   \text{\gl{xtrshort}{#3}}\@gls@increment@curr{count}{#3}%
762 }

```

Provide the plural acronym macro.

```

763 \expandafter\newcommand\csname#3s\endcsname{%
764   \if@begin@of@sentence{\cGlspl{#3}}{\cgl{spl}{#3}}%
765   \IfBooleanTF{#4}{\@xspace}%
766 }

```

Expand the plural acronym macro in PDF labels.

```

767 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%
768   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s} }%
769 }

```

Provide the plural acronym macro in math mode.

```

770 \expandafter\mathdef\csname#3s\endcsname{%
771   \text{\gl{xtrshortpl}{#3}}\@gls@increment@curr{count}{#3}%
772 }
773 }

```

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

```

774 \NewDocumentCommand{\shortacronym}{s}{

```

Provide the singular acronym macro.

```
775 \expandafter\newcommand\csname#3\endcsname{%  
776   \IfNoValueTF{#2}{#3}{#2}\IfBooleanTF{#4}{}\{\@xspace}%  
777 }
```

Expand the singular acronym macro in PDF labels.

```
778 \pdfstringdefDisableCommands{\expandafter\def\csname#3\endcsname{%  
779   \IfNoValueTF{#2}{#3}{#2} }%  
780 }
```

Provide the singular acronym macro in math mode.

```
781 \expandafter\mathdef\csname#3\endcsname{%  
782   \text{\IfNoValueTF{#2}{#3}{#2}}%  
783 }
```

Provide the plural acronym macro.

```
784 \expandafter\newcommand\csname#3s\endcsname{%  
785   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}}%  
786   \IfBooleanTF{#4}{}\{\@xspace}%  
787 }
```

Expand the plural acronym macro in PDF labels.

```
788 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%  
789   \IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s} }%  
790 }
```

Provide the plural acronym macro in math mode.

```
791 \expandafter\mathdef\csname#3s\endcsname{%  
792   \text{\IfBooleanTF{#1}{#3}{\IfNoValueTF{#2}{#3s}{#2s}}}%  
793 }%  
794 }
```

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

```
795 \NewDocumentCommand{\longacronym}{\somsmo}{
```

Provide the singular acronym macro.

```
796 \expandafter\newcommand\csname#3\endcsname{%  
797   \if@begin@of@sentence{\MakeUppercase#5}{#5}%  
798   \IfBooleanTF{#4}{}\{\@xspace}%  
799 }
```

Expand the singular acronym macro in PDF labels.

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


Provide the plural acronym macro.

```

801 \expandafter\newcommand\csname#3s\endcsname{%
802   \if@begin@of@sentence{%
803     \IfNoValueTF{#6}{\MakeUppercase#5s}{\MakeUppercase#6}%
804   }{%
805     \IfNoValueTF{#6}{#5s}{#6}}\IfBooleanTF{#4}{\@xspace}%
806 }

```

Expand the plural acronym macro in PDF labels.

```

807 \pdfstringdefDisableCommands{\expandafter\def\csname#3s\endcsname{%
808   \IfNoValueTF{#6}{#5s}{#6} }%
809 }
810 }

```

Silence warning if no acronyms are defined.

```

811 \renewcommand*{\@gls@write@entrycounts}{%
812   \immediate\write\@auxout{%
813     \string\providecommand*\string\@gls@entry@count}[2]{%
814   }%
815   \count@=0\relax
816   \forallglsentries{\@glsentry}{%
817     \glshasattribute{\@glsentry}{entrycount}{%
818       \ifglused{\@glsentry}{%
819         \immediate\write\@auxout{%
820           \string\@gls@entry@count{\@glsentry}{%
821             \glsentrycurrcount{\@glsentry}%
822           }
823         }%
824       }{\advance\count@ by \@ne
825       }{}%
826     }%
827 }

```

`\resetacronym` Add two macros for acronym management.

```

\dummyacronym
828 \newcommand{\resetacronym}[1]{\protect\glsreset{#1}}
829 \newcommand{\dummyacronym}[1]{\protect\glsunset{#1}}

```

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

```

830 \@ifundefined{endabstract}{\@gls@resetall}{%
831   \let\end@hep@abstract\endabstract%
832   \renewcommand\endabstract{\glsresetall\end@hep@abstract}%
833 }

```

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

```

\listoffigures
\listoftables
834 \let\hep@table@of@contents\tableofcontents

```

```

835 \renewcommand\tableofcontents{%
836   \glsunsetall\hep@table@of@contents\glsresetall%
837 }
838 \let\hep@list@of@figures\listoffigures
839 \renewcommand\listoffigures{%
840   \glsunsetall\hep@list@of@figures\glsresetall%
841 }
842 \let\hep@list@of@tables\listoftables
843 \renewcommand\listoftables{%
844   \glsunsetall\hep@list@of@tables\glsresetall%
845 }

```

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

```

846 \NewDocumentCommand{\acronyms}{om}{%
847   \IfNoValueTF{#1}{
848     \newglossary{#2}{#2.in}{#2.out}{#2}%
849     \renewcommand{\acronymtype}{#2}%
850   }{
851     \newglossary{#1}{#1.in}{#1.out}{#2}%
852     \renewcommand{\acronymtype}{#1}%
853   }
854 }

```

End of glossaries if.

```
855 \fi
```

K Biblatex datamodel file

`collaboration` Define the dbx file containing the hep-paper datamodel.

```

reportnumber
  pmid 856 \DeclareDatamodelFields[type=field, datatype=literal]{
  pmcid 857   collaboration, reportnumber, pmid, pmcid, pmc,
  pmc   858 }
protocollessurl 859 \DeclareDatamodelFields[type=field, datatype=uri]{protocollessurl}
860 \DeclareDatamodelEntryfields{
861   collaboration, reportnumber, pmid, pmcid, pmc, protocollessurl,
862 }

```

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Change History

v1.0		of biblatex datamodel into its own	
General: Initial version of the style file.	1	file	1
v1.1		v1.4	
General: Transition to documented		General: If possible the compatibility	
\LaTeX source file.	1	options are selected automatically.	
v1.2		Inclusion of PubMed IDs in	
General: Introduction of package		bibliography.	1
options.	1	v1.5	
v1.3		General: Reduce the numer of math	
General: Inclusion of JHEP and		alphabets used in sans serif mode.	
JCAP package options. Fix of		Add more title options such as a	
incompatibility with recent		subtitle. Use standard class	
subcaption package version. Move		options.	1