The hep-paper package∗
Publications in high energy physics
Jan Hajer†
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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.

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∗This document corresponds to hep-paper v2.2.
†jan.hajer@tecnico.ulisboa.pt
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 hep-font package [3]. Finally, portable document format (PDF) hyperlinks are implemented with the hyperref package [4].

1.1 Options

\textbf{paper} The \texttt{paper=(format)} option loads the specified paper format. The possible \texttt{(formats)} are: \texttt{a0}, \texttt{a1}, \texttt{a2}, \texttt{a3}, \texttt{a4}, \texttt{a5}, \texttt{a6}, \texttt{b0}, \texttt{b1}, \texttt{b2}, \texttt{b3}, \texttt{b4}, \texttt{b5}, \texttt{b6}, \texttt{c0}, \texttt{c1}, \texttt{c2}, \texttt{c3}, \texttt{c4}, \texttt{c5}, \texttt{c6}, \texttt{ansia}, \texttt{ansib}, \texttt{ansic}, \texttt{ansid}, \texttt{ansie}, \texttt{letter}, \texttt{executive}, \texttt{legal}. The default is \texttt{a4}.

\textbf{font} The \texttt{font=(size)} option loads the specified font size. The possible \texttt{(sizes)} are: \texttt{8pt}, \texttt{9pt}, \texttt{10pt}, \texttt{11pt}, \texttt{12pt}, \texttt{14pt}, \texttt{17pt}, \texttt{20pt}. The default is \texttt{11pt}.

\textbf{lang} The \texttt{lang=(name)} option switches the document language. The default is \texttt{british}.

\textbf{sansserif} The \texttt{sansserif} option switches the document including math to sans serif font shape.

\textbf{oldstyle} The \texttt{oldstyle} option activates the use of oldstyle text- (123) in favour of lining- (123) figures in text mode.

\textbf{parskip} The \texttt{parskip} option changes how paragraphs are separated from each other using the \texttt{parskip} package [5]. The \LaTeX{} default is separation via indentation the \texttt{parskip} option switches to separation via vertical space.\footnote{Although the \texttt{parskip} option is used for this document, it is recommended only for very few document types such as technical manuals or answers to referees.}

\textbf{symbols} The \texttt{symbols=(family)} is passed to the \texttt{hep-math-font} package [6] and sets the family of the symbol fonts. \texttt{symbols=false} deactivates loading any 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 can prevent such and other adjustments.

\textbf{defaults} The \texttt{defaults} option prevents the adjustment of the page geometry and the font size set by the document class.

\textbf{title} The \texttt{title=false} option deactivates the title page adjustments.

\textbf{bibliography} The \texttt{bibliography=(key)} option prevents the automatic loading of the \texttt{hep-bibliography} package [7] if \texttt{(key)=false}.

\textbf{glossaries} The \texttt{glossaries=false} option deactivates acronyms and the use of the \texttt{hep-acronym} package [8].

\textbf{references} The \texttt{references=false} option prevents the \texttt{cleveref} package [9] 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 \([10]\) compatibility mode.
- **jhep** The jhep option activates the JHEP \([11]\) compatibility mode.
- **jcap** The jcap option activates the JCAP \([12]\) compatibility mode.
- **revtex** The revtex option activates the REVTEX \([13]\) compatibility mode.
- **pos** The pos option activates the PoS compatibility mode.
- **springer** The springer option activates the compatibility mode the svjour class \([14]\).

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

- **twocolumn** If the global twocolumn option is present the page geometry is changed to cover almost the entire page. Additionally the abstract* environment is defined that generates a one column abstract and takes care of placing the title information.

2.1 Title page

- **\series** The \series\{⟨series⟩\} macro is defined using the hep-title package \([15]\).
- **\title** The PDF meta information is set according to the \title\{⟨text⟩\} and \author\{⟨text⟩\} information.
- **\subtitle** The \subtitle\{⟨subtitle⟩\} macro is defined.
- **\editor** The following lines add e.g. two authors with different affiliations
- **\author** \author\{⟨text⟩\}
- **\affiliation** \affiliation\{⟨text⟩\}
- **\email** \email\{⟨text⟩\}
- **\preprint** The \preprint\{⟨text⟩\} 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.
- **\titlefont** Various title font macros are defined, allowing to change the appearance of the \maketitle output.
- **\subtitlefont**
- **\authorfont**
- **\affiliationfont**
- **\preprintfont**
2.2 Text

The \textsc{inlinelist} and \texttt{enumdescript} environments are defined.

\underline{inlinelist}

A bold versions \texttt{SMALL CAPS} and a sans serif version of \texttt{SMALL CAPS} is provided.

\underline{enumparskip}

The \texttt{underline} macro is redefined to allow line-breaks. The \texttt{overline} macro is extended to also overline text outside of math environments.

\underline{parskip}

If the \texttt{parskip} option is activated the \texttt{useparindent} macro switches to the usual parindent mode, while the \texttt{useparskip} macro switches to the parskip mode.

2.2.1 References and footnotes

\underline{cref}

References are extended with the \texttt{cleveref} package \cite{g}, which allows to e.g. just type \texttt{\cref{(key)}} in order to write ‘figure 1’. Furthermore, the \texttt{cleveref} package allows to reference multiple objects within one \texttt{\cref{(key1,key2)}}.

\underline{cite}

Citations are adjusted to not start on a new line in order to avoid the repeated use of \texttt{-\cite{(key)}}.

\underline{ref}

References are also adjusted to not start on a new line.

\underline{eqref}

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

2.2.2 Acronyms

\underline{acronym}

The \texttt{hep-acronym} package \cite{8} is loaded. The \texttt{\acronym{}} \texttt{\{type\}} \texttt{\{abbreviation\}} \texttt{\{definition\}} macro generates the singular \texttt{\abbreviation\{\textit{abbreviation}\}} and plural \texttt{\abbreviation\{\textit{abbreviation}\}} 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. The long form is never used in math mode. Capitalization at the beginning of paragraphs and sentences is (mostly) ensured. The \texttt{\shortacronym} and \texttt{\longacronym} macros are drop-in replacements of the \texttt{\acronym} macro showing only the short or long form of their acronym.

2.3 Math

\underline{mathbf}

The \texttt{hep-math} \cite{16} and \texttt{hep-math-font} \cite{6} packages are loaded. Bold math, via \texttt{\mathbf} is improved, i.e. \texttt{(Ab\textgreek{G}Ab\textgreek{D})}. Macros switching to \texttt{\textbf{series}} such as \texttt{\section{\textit{text}}} are ensured to also typeset math in bold. The \texttt{\textit{text\{\textit{text}\}}} macro makes it possible to write text within math mode, i.e. \texttt{(Ab\textgreek{G}Ab\textgreek{D})}. 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. \texttt{(Ab\textgreek{D}Ab\textgreek{D}). The} \texttt{\mathcal{font} i.e. \{ABC\} is accompanied by the \texttt{\mathsc{r}font} i.e. \texttt{(\textit{abc})}. The \texttt{\mathbb{font} is adjusted depending on the \texttt{sansserif} option i.e. (Ab\textgreek{I}). Finally, the \texttt{\mathfrak{font} is also available i.e. (Ab\textgreek{B}12).}

\underline{nicefrac}

The \texttt{\textfrac{\{number\}}{\{number\}}} macro is accompanied by \texttt{\nicefrac\{\{number\}\}}{\{\{number\}\}}, \texttt{\textfrac{\{number\}}{\{number\}}} and \texttt{\nicefrac\{\{number\\}}{\{\{number\\}}} leading to \texttt{\nicefrac{\{number\}}{\{number\}}}, \texttt{\nicefrac{\{number\}}{\{number\}}} and \texttt{\nicefrac{\{number\}}{\{number\}}} operators are defined.

\underline{diag}

The \texttt{\textfrac\{\{name\}\}}\{\{arguments\}\}\{\{code\}\} macro \texttt{\textdef{\{\{name\\}}} defines macros only within math mode without changing the text mode definition.

\underline{sgn}

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

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

Greek letters are adjusted to always be italic and upright in math and text mode, respectively, using the hep-math-font [6] package. This allows differentiations like

\[
\sigma = 5 \text{ fb}, \quad \text{at } 5 \sigma \text{ C.L.}, \quad \mu = 5 \text{ cm}, \quad l = 5 \text{ \mu m}. \tag{1}
\]

Additionally, Greek letters can also be directly typed using Unicode.

The \cancel\{characters\} macro and the \slashed\{character\} macro allow to cancel math and use the Dirac slash notation i.e. \(\cancel{\varphi}\), respectively.

A better looking over left right arrow is defined i.e. \(\overleftarrow{\partial}\).

### 2.4 Floats

The hep-math package [16] provides additional macros such as

\[
(\phi), \quad \frac{\partial^3 f}{\partial x \partial y^2}, \quad [A, B], \quad O(x^2), \quad x|_0^\infty, \quad \det(M). \tag{2}
\]

### 2.5 Bibliography

The biblatex package [18] 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 [19]. biblatex is extended by the hep-bibliography package [7] 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,
## 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 [20] 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 [21] alleviates this problem by collecting all files necessary for publication on arXiv (including figures).

### References


