The HEP-PAPER package*

Complete article preamble: fonts, math, title, references, floats, acronyms and bibliography

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Abstract

The HEP-PAPER package is the aggregate publication setup for the HEP package suite. It configures the page geometry, language, fonts, hyperlinks, title data, bibliography, acronyms, references, floats, text helpers, and math fonts by loading the corresponding modular packages with publication-oriented defaults.

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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 are the changes 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, text and math fonts are configured with HEP-FONT and HEP-MATH-FONT, text helpers with HEP-TEXT, bibliographies with HEP-BIBLIOGRAPHY, acronyms with HEP-ACRONYM, references and hyperlinks with HEP-REFERENCE, titles with HEP-TITLE, and floats with HEP-FLOAT.

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. Font and paper size options of the document class, such as `12pt` or `letterpaper`, replace these defaults, while explicit `font` and `paper` options of this package take precedence.

`lang` The `lang`=⟨*name*⟩ option switches the document language. The default is `british`.

`sansserif` The `sansserif` option switches the document including math to sans serif font shape.

`oldstyle` The `oldstyle` option activates the use of oldstyle text- (123) in favour of lining- (123) figures in text mode.

`parskip` The `parskip` option changes how paragraphs are separated from each other using the PARSKIP package [3]. The LaTeX default is separation via indentation the `parskip` option switches to separation via vertical space.[1]

`symbols` The `symbols`=⟨*family*⟩ is passed to the HEP-MATH-FONT package [4] and sets the family of the symbol fonts. `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.

`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. In the compatibility modes it switches back to the title macros of the journal class or style, see section 1.1.3.

`bibliography` The `bibliography`=⟨*key*⟩ option prevents the automatic loading of the HEP-BIBLIOGRAPHY package [5] if ⟨*key*⟩=`false`.

`glossaries` The `glossaries=false` option deactivates acronyms and the use of the HEP-ACRONYM package [6].

`references` The `references=false` option prevents the CLEVEREF package [7] 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. Classes are always loaded before, so the options are only needed for the JHEP and JCAP styles, which they load. An option is ignored with a warning if its class or style is not available.

`beamer` The `beamer` option activates the BEAMER [8] compatibility mode. Like the `amsart` and `pos` options it keeps HEP-ACRONYM from loading TITLESEC, which does not support the sectioning commands of BEAMER.

`jhep` The `jhep` option activates the JHEP [9] compatibility mode.

`jcap` The `jcap` option activates the JCAP [10] compatibility mode.

`revtex` The `revtex` option activates the REVTEX [11] compatibility mode.

`pos` The `pos` option activates the PoS compatibility mode. It implies `symbols=false`, because the PoS class already uses most of the 16 math families available in pdfLATEX. Like the `amsart` option it keeps HEP-ACRONYM from loading TITLESEC, which is incompatible with the sectioning code of these classes.

`springer` The `springer` option activates the compatibility mode the `svjour` class [12].

`amsart` The `amsart` option activates the compatibility mode for the `amsart` class.

`koma` The `koma` option activates the compatibility mode for the KOMA-SCRIPT classes `scrartcl`, `scrreprt`, and `scrbook` [13]. It keeps the font size and the type area of the class and, like the `amsart` option, keeps HEP-ACRONYM from loading TITLESEC, which is not recommended with these classes.

1.1.3 Switching journals

A document can be written with the `article` class and be switched to a journal by changing only the `\documentclass` line, or by adding the `jhep` or `jcap` option, which load the JHEP and JCAP styles. In all compatibility modes except `beamer` the title macros of section 2.1 keep their meaning. The HEP-JOURNAL package stores the title data and hands them to the macros of the journal when the title is made:

JHEP and JCAP The affiliation labels become letters in the order of first use, emails become `\emailAdd`, thanks become `\note`, the series becomes the `\subheader`, and the first arXiv number becomes the `\arxivnumber`. Preprint numbers are placed in the header.

REVTEX Every author is followed by the emails, thanks, and affiliations, which REVTEX merges if they are identical. Preprint and arXiv numbers become `\preprint`s.

Springer For the EPJ style the emails and thanks become `\thankstext`s and the affiliations an `\institute` with labels, all referred to by `\thanksref`. For the plain `svjour3` class every

[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.

author is listed in the `\institute` together with the affiliations and emails. The keywords are placed in the abstract.

amsart Every author is followed by an `\address` for each affiliation, the emails, and the thanks.

PoS Every author gets one `\author` with the affiliations and emails. The series becomes `\FullConference` and the title `\ShortTitle`, unless these are given, and the keywords are appended to the abstract.

KOMA-Script The series becomes the `\subject`, preprint and arXiv numbers are placed in the `\titlehead`, and the subtitle is passed on. The authors get the letters of their affiliations, unless there is only one affiliation, and their emails and thanks as footnotes. The affiliations are listed in `\publishers`, below the authors and the date. The abstract and the keywords follow the title, and an abstract later in the document is typeset where it stands.

The abstract can be placed according to the conventions of any of these journals: after `\maketitle` (ARTICLE, SVJOUR3), before `\maketitle` in the document (REVTEX, AMSART), or in the preamble, either as environment or in the command form `\abstract{`⟨*text*⟩`}` (JHEP, JCAP, PoS). An abstract that follows the title only after other material is placed in the title of the next run, if the journal expects the abstract before the title. The PoS class makes the title itself, at the beginning of the document, if the abstract is given in the preamble; otherwise the title is made by `\maketitle`. Title data without counterpart in the journal, such as editors or ORCID identifiers in most journals, are ignored with a warning, and the layout macros of the title are ignored. Journal specific macros such as `\collaboration` or `\journalname` can be used in addition. With `title=false` the title data have to be given with the macros of the journal.

1.1.4 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` `abstract*` 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 [14].

`\title` The portable document format 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` `\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}
```

\preprint The `\preprint{`⟨*numer*⟩`}` macro places a pre-print number in the upper right corner of the title page.

abstract (*env.*) The `abstract` environment is adjusted to not start with an indentation.

\titlefont
\subtitlefont
\authorfont
\affiliationfont
\preprintfont Various title font macros are defined, allowing to change the appearance of the `\maketitle` output.

2.2 Text

inlinelist
enumdescript The `inlinelist` and `enumdescript` environments are defined.

\textsc A bold versions **Small Caps** and a sans serif version of Small Caps is provided.

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

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

2.2.1 References and footnotes

\cref References are extended with the cleveref package [7], 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.

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

2.2.2 Acronyms

\acronym
\shortacronym
\longacronym The hep-acronym package [6] is loaded. The `\acronym`⟨*⟩`[`⟨*typeset abbreviation*⟩`] {`⟨*abbreviation*⟩`}`⟨*⟩`{`⟨*definition*⟩`}[`⟨*definition*⟩`]` macro generates the singular `\`⟨*abbreviation*⟩ and plural `\`⟨*abbreviation*⟩`s` 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 `\shortacronym` and `\longacronym` macros are drop-in replacements of the `\acronym` macro showing only the short or long form of their acronym.

2.3 Math

\mathbf The hep-math [15] and hep-math-font [4] packages are loaded. Bold math, via `\mathbf` is improved, i.e. ($AbI\Gamma\delta\boldsymbol{AbI\Gamma\delta}$). Macros switching to `bfseries` such as `\section{`⟨*text*⟩`}` are ensured to also typeset math in bold. The `\text{`⟨*text*⟩`}` macro makes it possible to write text within math mode, i.e. (AbIΓδ**AbIΓδ**). 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. ($\mathit{AbI\Gamma\delta}\boldsymbol{\mathit{AbI\Gamma\delta}}$). The `\mathcal` font i.e. ($\mathcal{ABCD}$) is accompanied by the `\mathscr` font i.e. ($\mathscr{ABCD}$). The `\mathbb`

\text
\mathsf
\mathscr
\mathbb

`\mathfrak` font is adjusted depending on the `sansserif` option i.e. ($\mathbb{Ah1}$). Finally, the `\mathfrak` font is also available i.e. ($\mathfrak{Aa}\mathfrak{Bb12}$).

`\nicefrac` `\flatfrac` `\textfrac` The `\frac{`⟨*number*⟩`}{`⟨*number*⟩`}` macro is accompanied by `\nicefrac{`⟨*number*⟩`}{`⟨*number*⟩`}`, `\textfrac{`⟨*number*⟩`}{`⟨*number*⟩`}`, and `\flatfrac{`⟨*number*⟩`}{`⟨*number*⟩`}` leading to $\frac{1}{2}$, 1/2, 1/2, and 1/2. Diagonal matrix `\diag` and signum `\sgn` operators are defined.

`\diag` `\sgn` `\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` `\numberwithin` `subequations` 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.

`\unit` `\inv` The correct spacing for units, cf. equation (2.1), 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 $5\,\mathrm{fb}^{-1}$ 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 [4] package. This allows differentiations like

$$\sigma = 5\,\mathrm{fb}\,, \qquad \text{at } 5\,\sigma \text{ C.L.}\,, \qquad \mu = 5\,\mathrm{cm}\,, \qquad l = 5\,\mu\mathrm{m}\,. \tag{2.1}$$

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

`\ev` `\pdv` `\comm` `\order` The HEP-MATH package [15] provides additional macros such as

$$\langle\phi\rangle\,, \qquad \frac{\partial^3 f}{\partial x \partial y^2}\,, \qquad [A,B]\,, \qquad \mathcal{O}(x^2)\,, \qquad x\big|_0^\infty\,, \qquad \det(M)\,. \tag{2.2}$$

`\cancel` `\slashed` The `\cancel{`⟨*characters*⟩`}` macro and the `\slashed {`⟨*character*⟩`}` macro allow to ~~cancel~~ math and use the Dirac slash notation i.e. $\not{\partial}$, respectively.

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

2.4 Floats

`figure` (*env.*) `table` (*env.*) Automatic float placement is adjusted to place a single float at the top of pages and to reduce the number of float pages, using the HEP-FLOAT package [16]. The most useful float placement is usually achieved by placing the float *in front* of the paragraph it is referenced in first.

`panels` (*env.*) `\panel` The `panels` environment 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}[`⟨*vertical alignment*⟩`]{`⟨*width*⟩`}` 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{`⟨*width*⟩`}` macro takes the width of the next sub-float as mandatory argument.

`\graphic` `\graphics` The `\graphic[`⟨*width*⟩`]{`⟨*figure*⟩`}` macro is defined, which is a wrapper for the `\includegraphics{`⟨*figure*⟩`}` 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{`⟨*subfolder*⟩`}`.

2.5 Bibliography

\bibliography
\printbibliography

The BIBLATEX package [17] 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 [18]. BIBLATEX is extended by the HEP-BIBLIOGRAPHY package [5] 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 `eprinttype`s. Errata can be included using the `related` feature.

erratum

```
\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` [19] 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 [20] alleviates this problem by collecting all files necessary for publication on arXiv (including figures).

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