Exploring mSUGRA in the top quark sector at the LHC

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ABSTRACT: The sensitivity to exclude mSUGRA models during the early running of the Large Hadron Collider at 7 TeV centre-of-mass energy is explored in the event topology reflecting the production of top quark pairs.

Dedicated to. . .
if you want.

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Contents

1. Introduction

These pages provide an example of the format employed for publishing papers in the JHEP Electronic Journal.

Papers are written using LaTeX 2_ε in the class JHEP, provided by the file `JHEP3.cls`.

The JHEP class is an extension of the standard article class, and files written in article style are typeset just by changing the class name (possibly after making some minor changes).

The JHEP class can in fact also be used to prepare preprints. This is recommended in case one eventually intends to submit a paper to JHEP.

While respecting the common latex syntax, JHEP incorporates features like automatic in-text figures and hyper-references for formulæ, bibliography and table of contents.

Hyper-functionality has been added to the normal LaTeX instructions so that there is no need to learn new commands, except for new operations like hyper-linking inside or outside the document, and sending e-mail.

`JHEP3.cls` has been developed to run on a version of LaTeX 2_ε newer than or equal to 'June 96', for code compatibility.

pdflatex can be used, but not with the `published` option. Also remember that pdflatex with `\pdfoutput=1` implies that you are using figures in formats like `pdf`, `jpg` or `png`. If you then submit your paper to JHEP your file will be compiled with LaTeX and only postscript figure are acceptable.

2. Syntax

The JHEP class has just a minor number of differences compared to the standard article of LaTeX, as well as some new features. This table shows the structure of a document.

The first command declares that you are using the JHEP class, and provides the desired options.

Then `\title`, `\author`, `\abstract` are required for the title page contents.

A command `\preprint` is active to insert the preprint numbers at the top right-hand corner, unless the `published` option is provided.

In this case the paper is assumed to

```
\documentclass[options]{JHEP3}
\title{...}
\author{name1\\ addr\\ E-mail: \email{...}}
\author{name2\\ addr\\ E-mail: \email{...}}
\abstract{...}
\keywords{...}
                    ⎧ \received{...}
                    ⎪ \revised{...}
\preprint{...} or   ⎨ \accepted{...}
                    ⎩ \JHEP{...}
\dedicated{...}
⋮
\begin{document}
⋮
\acknowledgments
⋮
\end{document}
```

Table 1: Structure of a document

be accepted for publication in JHEP and its history must be supplied with the commands `\received`, (possibly `\revised`), `\accepted`, `\JHEP`.

hyper(*), nohyper ≡ paper	To choose between hyper and paper versions. Hyper version is hyper-active and oneside. Paper version is not hyper-active.
draft	Enables the draft mode: labels and citations appear on the margin, processing info at the top of every page, and epsfig figures appear as a box with the filename.
a4paper(*), letterpaper legalpaper executivepaper	Standard paper size options. Options a5paper, b5paper, landscape are not defined.
11pt(*), 12pt	For preprints only, the author can choose 11pt or 12pt.
oneside(*), twoside	These set the page margins for one or two-side mode and the side of figures, tables and margin notes.
notoc	To disable the automatic table of contents.
published	Inserted by the Journal for processing accepted papers.

Table 2: Options. (*) are defaults.

On published papers informations on copyright and publication automatically appear on the front page. Commands to modify these infos are \JHEPcopydate (to change the copyright year, that by default is the current one) and \JHEPspecialurl (to modify the url where the document is available).

At \begin{document} a title page is automatically generated so that there is no need for a \maketitle command, or titlepage option.

An \acknowledgments command can be used to insert the relative section, in its place, e.g. at the end of the introduction or after the conclusions.

3. Options

Table 2 shows the options which can be used at the \documentclass command for JHEP:

Options with an asterisk (hyper, a4paper, 11pt, oneside) are the default behavior. Note that titlepage, 10pt, a5paper, b5paper, landscape are not provided. The option proceedings still exists but should not be used and will be removed in future releases.

4. Genaral layout

The following defaults are fixed as the selected format for publication and, accordingly, some LaTeX commands and options are disabled.

4.1 Dimensions

The width and the height of the text depend on the declared paper type. They amount to 74% of the paper width and 77% of the paper height.

The default is `a4paper`, and the text dimensions are shown on these pages: width 15.5 cm, height 22.8 cm.

The value of `\baselinestretch` is set to 1.1 line spacing.

4.2 Pagestyle

The selected pagestyle is that of the present example and `\pagestyle`, `\thispagestyle` are ignored.

4.3 Fonts

The default font is a 11 point CM Roman, both for the hyper version than the paper one. This dimension is easy to read on the screen and is suitable for reduction. This is the only choice allowed for published papers.

For preprint papers the author is free to choose a `11pt` or `12pt` option.

4.4 Table of contents

A table of contents is automatically inserted at the top of the second page, before the document starts. In case a document had no sections (e.g. letters or short communications) the table of contents is omitted.

In preprint mode, the `notoc` option can be given to suppress this feature.

5. Title page

A title page is automatically generated at the beginning of the document, in 'flushed left' style. Note that `\maketitle` or the `titlepage` option no longer exist.

The top line contains either the preprint numbers or the JHEP logo, plus publication information, for papers accepted by the Journal. All the information on the title page is supplied with the following commands which must appear in the preamble.

5.1 Mandatory commands

`\title{...}` The title, typeset in Sans-Serif. As in the titles of sections, only the first letter is capital (and the initials of personal names). Avoid, if possible, math symbols, otherwise write them in normal math style, without `\mathbold`.

`\author{...\\...}` This command provides the name of one or more authors. The lines after '\\' are typeset as the address, where line breaks can be obtained with further '\\' commands.

List multiple authors in alphabetical order, grouping in the same `\author` field authors belonging to the same institution, while for other authors with different addresses more `\author` commands can be used. Use exponents $^{ab...}$ only when the situation in very intricated. Reference to grants and financial supports should be moved to the acknowledgments.

For each author provide: first and family name; complete institution's name and address (if possible, only one per author); e-mail address (with the command `\email`).

`\abstract{...}` This provides the abstract, and substitutes the old LaTeX environment. By choice, only 'horizontal' material can be put in the abstract, to prevent line breaks and display-math formulæ. In-text formulæ are of course allowed. Also note that the abstract is part of the title page and thus must be declared *before* `\begin{document}`. The abstract must be short enough to be fully contained in the title page.

5.2 Optional commands

`\thanks{...}` This command generates a footnote on the title page and should be used inside `\author` to provide additional information for any single author, like research grants, sponsoring agencies, present address when different from the normal address, alternative e-mail addresses.

`\preprint{...}` This command is used to provide the preprint reference numbers. It inserts this information at the top right-hand corner of the title page.

`\keywords{...}` This command inserts a line containing the keywords for the paper in question. A list of keywords is provided by the JHEP Journal. They must appear on the same line separated by commas.

`\dedicated{...}` This command inserts a dedication on the titlepage below the abstract, it is flushed right in small italic style.

`\received{...}, \revised{...}, \accepted{...}, \JHEP{...}`
These four commands should not be used by authors. They are automatically inserted by the Journal to show, in the head of the first page, the dates of arrival (revision) and acceptance, and to insert a 'watermark' to show the vertical JHEP numbering in the published version.

6. The main text

The text is usually divided into numbered *sections*. Avoid, if possible, subsubsections, and never use non-numbered sections. For small subsections not to appear in the ToC, the command `\paragraph` can be used.

Appendices, to be put between the acknowledgments and the bibliography, are obtained with command `\appendix` before the first `\section{Title of appendix}`. In this way also equations are numbered correctly. Titles of appendices shoul not be simply "Appendix A, B..."

To emphasize words or sentences within the text do not use **boldface**, *slanted* or sans-serif. Use, sparingly, only *italic*, possibly with the `\emph` command.

Latin abbreviations (e.g.: et al.) should be written without emphasis (i.e. in roman characters).

6.1 Mathematics

Equations are formatted as in plain LaTeX, plus hyperlinks, like in the example at the end of these pages (see equation B.3). The spacing around the `&`'s in the `eqnarray` environment is slightly reduced, equal to that of the `equation` environment.

Only very short and simple formulæ should be left *undisplayed*. In particular avoid it when the formula contains high material, like a big fraction, an integral or a matrix. A small fraction can be left in text, writing it in solidus: $\partial y/\partial x$ and not $\frac{\partial y}{\partial x}$, unless it is the coefficient of a longer expression. For matrices see below. For integrals and series don't use `\displaystyle`.

In *displayed formulæ* all the above symbols go in `\displaystyle`. In particular remember that you have to declare it explicitly in some environments, like `{array}`.

Whenever opportune use `\left` and `\right` to make sure that the parentheses or brackets are big enough.

Displayed formulæ are part of the text. So *punctuation* before and after them is to be put accordingly. At the end of a formula put a small space `\,` before the punctuation, except when the formula finishes with a delimiter (like $),],\},|,\|$) obtained with `\right`, which adds spacing by itself.

Multiple formulæ must be aligned on the equal signs:

$$\mu_B^j = \frac{1}{Q} w_\alpha^j \eta_B^\alpha \,,$$
$$\bar\mu_j^B = \frac{1}{Q} \bar\eta_\alpha^B \bar w_j^\alpha \,. \tag{6.1}$$

If the equations are short they can also be written as

$$\mu_B^j = \frac{1}{Q} w_\alpha^j \eta_B^\alpha \,, \qquad \bar\mu_j^B = \frac{1}{Q} \bar\eta_\alpha^B \bar w_j^\alpha \,,$$

the space between them being always `\qquad`.

The same alignment rule holds for continued equations

$$\mu_B^j = \frac{1}{Q} w_\alpha^j \eta_B^\alpha$$
$$= \frac{1}{Q} \bar\eta_\alpha^B \bar w_j^\alpha \,, \tag{6.2}$$

without repetition of the equal sign. Of course the signs on wich the alignment is placed can be also $>$, $\geq$, $\sim$, $\leftrightarrow$ etc., provided they have the same role in the two equations.

If an equation is too long to fit in one line, it must be broken as in the following example

$$
\begin{aligned}
J = {} & \frac{1}{2} P \gamma \pi \left[\gamma(\gamma^2 + 1) \left\{ (\alpha^2 + \beta^2)^2 - 2(\alpha^2 - \beta^2) + 1 \right\} \right] \times \\
& \times \Bigg\{ (\alpha + \beta) \left\{ (\alpha^2 + \beta^2)^2 + 2\gamma^2(\alpha^2 - \beta^2) + \gamma^4 \right\} + \\
& \qquad + d \left[\left\{ (\alpha^2 + \beta^2)^2 - 2(\alpha^2 - \beta^2) + \gamma^4 \right\} + \frac{\gamma^2 + 1}{\alpha^2 + \beta^2} (3\alpha^2 - \beta^2 - 1) \right] \Bigg\} \\
& \geq 0 \,.
\end{aligned}
$$

This example shows several features of broken formulæ. The alignment for operation signs is immediately right of the equal sign. The formula is broken at the end of mathematical

phrase, e.g. before a big brace. When the break occurs inside a brace the continuing lines are to be indented until the brace using `\hphantom`. The opening curly brace is as big as the closing one, even though the second line does not contain high material. The operation signs (and *not* the (in)equality signs) are repeated at the end of a line and the beginning of the following one. Notice that when the break occurs in a product (usually written be juxtaposition) the sign $\times$ is used.

When also the left hand side is long the best place to break the formula is the equal sign, somewhat shifting the right and left had sides:

$$
\int_0^\infty dx \left\{ l_r(ax) \, J_s(bx) + J_r(ax) l_s(bx) \right\} =
$$
$$
= \int_0^\infty dx \left\{ m_r(ax) \, H_s(bx) + H_r(ax) m_s(bx) \right\}.
$$

Excluding the dramatic case of page-long formuale, avoid breaking formulæ across pages, possibly modifying the text. Exceptionally it can be acceptable for different aligned equations like (6.1)

Special symbols. The package `amssymb` (see [2, chapter 8]) is used by defauld in the `JHEP3.cls`.

In this package the fonts `\mathbb` are available, which are used for sets of numbers (such as the reals $\mathbb{R}$, the integers $\mathbb{Z}$, and so on...) and for other classical uses such as projective spaces $\mathbb{CP}$ and $\mathbb{WP}$. Unfortunately this provides only capital letters. If one needs $\mathbb{1}$ to denote unitary matrix (or other numbers), this is obtained with the package `bbm` and the command `\mathbbm{1}`.

This package provides also many other mathematical symbols. Two symbols that often authors end up defining by themselves are

$$
\texttt{\textbackslash lesssim} \qquad \lesssim \qquad\qquad \texttt{\textbackslash gtrsim} \qquad \gtrsim
$$

As for matrices the best choice is `\pmatrix{a&b\cr c&d}`.[1] Which gives

$$
\begin{pmatrix} a & b \\ c & d \end{pmatrix}.
$$

Avoid matrices in the text, but if it is necessary, use the same command in scriptsize: `{\scriptsize$\pmatrix{a&b\cr c&d}$}` gives $\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right)$. A summary of special symbols is given in table 3.

6.2 Theorems and such

The format for theorems, lemmas and so on is established. As usual they are to be defined by `\newtheorem{theorem}{Theorem}`, `\newtheorem{lemma}{Lemma}` .... The command `\Proof` is provided to introduce the proof.

---

[1] Notice that the end of line is given by `\cr` and not by `\\`.

| Sets of numbers	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}, \mathbb{C}, \ldots$	To be written with font
Tori	$\mathbb{T}$	`\mathbb` given
Projective spaces	$\mathbb{P}, \mathbb{CP}, \mathbb{WP}^1$	by package `amssymb`
Unitary matrix	$\mathbb{1}$	`\mathbbm{1}`.
Groups	$\mathrm{SU}(N), \mathrm{U}(2)$	`\mathop{\rm SU}(N),`
		`\mathop{\rm {}U}(2)`
	$\mathrm{Spin}(2)$	`\mathop{rm Spin}(2)`
	$\mathrm{SL}(2, \mathbb{Z})$	`\mathop{\rm SL}(2,\mathbb{Z})`
anti-de Sitter	AdS, AdS/CFT	no mathmode when the name of a theory
	$AdS \times S^5 \ldots$	mathmode when it's a manifold
	type-IIB, type IIB...	hyphenated only if it's an adjective:
	large-N, large N	e.g. "large-N theory holds for large N"
Real and	Re z, Im z	Always with `\mathop`.
imaginary parts		Don't use the awful `\Re` which gives $\Re$.
Text in formulæ	$F + \text{c.c.} = \text{const.}$	In roman: use `\hbox` in text,
and subscripts	$f_{\max}$	and `\rm` in subscripts
Matrices	$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$	Use `\pmatrix{a & b \cr c & d}` and
	small $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ in text and	`{\scriptsize$\pmatrix{...}$}`

Table 3: Special symbols.

7. Extra features

7.1 Figures and tables

The JHEP class can insert figures and tables in the text via the two basic commands:

`\FIGURE[pos]{body}`

This command inserts an in-text figure like the example on the right. The `body` can contain any 'horizontal' material, *i.e. no vskips*, and its width is automatically calculated. To select a given width one should enclose the content in a `\parbox`.

The `\caption{...}` command can be used inside and works as usual. A typical form of `body`, which uses `epsfig`, is '`\epsfig{...}\caption{...}`', with any size changing commands.
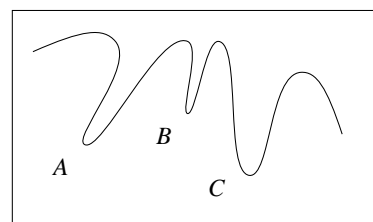

Figure 1: Made with `\FIGURE`.

`\TABLE[pos]{body}`

This command is similar to `\FIGURE`. As with the `table` environment of LaTeX, authors have to use a `tabular` environment inside to generate the actual table.

Both commands generate floating objects which are inserted in the text as soon as there is enough space on the page. If the object happens to be larger than 60% of the textwidth, it is centered in the page like usual LaTeX floats.
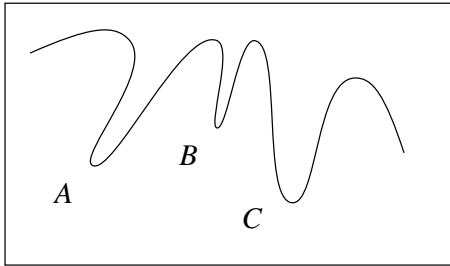
Figure 2: caption 1
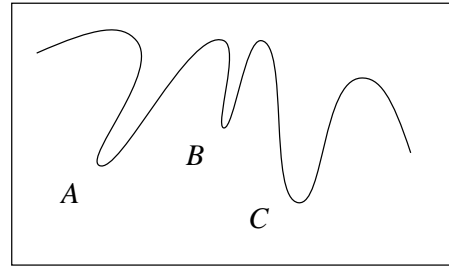
Figure 3: caption 2

The optional argument `pos` can be used to change the *horizontal* positioning, which by default is `p`. This corresponds to: right hand side in one-side mode or outer part of the pages in two-side mode.

r	*right hand side*
l	*left hand side*
p(*)	*right* in one-side mode *alternating* in two-side mode

Table 4: Horizontal position as in [1]

Note that the side of pages is inverted with respect to usual numbering, due to the title page.

In case the figure or table is larger than 60%, the argument `pos` selects the *vertical* positioning as in LaTeX [2], with the default setting `ht`. As a consequence, by default, the big floats appear either at the point where they are called or at the top of subsequent pages.

When in draft mode, if one wants a list of figures (or of tables) an optional argument to the caption should be added containing the text due to appear in the list.

Two further commands are provided as a shorthand for useful forms of `\FIGURE` and `\TABLE`:

```
\EPSFIGURE[pos]{filename}{capt}
```

this command produces an in-text figure by calling the given *EPS file* with `\epsfig`. It is equivalent to: `\FIGURE[pos]{\epsfig{file=filename}\caption{capt}}`.

Note that to use this command, the package `epsfig` has to be invoked in the preamble with `\usepackage{epsfig}`. Using `epsfig` also gives the opportunity to scale the figures via the keywords `width` or `height`, e.g.: `\EPSFIGURE[pos]{filename,width=...}{capt}`.

```
\TABULAR[pos]{align}{body}{capt}
```

This command can be used to produce a complete table: `align` represents the alignment directives as in the `tabular` environment, `body` contains the table entries, and `capt` the table caption. This is equivalent to:

`\TABLE[pos]{\begin{tabular}{align}body\end{tabular}\caption{capt}}`

Moreover there are the commands

```
\DOUBLEFIGURE[pos]{filename1}{filename2}{capt1}{capt2}
```

```
\DOUBLETABLE[pos]{\begin{tabular}...\end{tabular}}
               {\begin{tabular}...\end{tabular}}{capt1}{capt2}
```

to put two figures (or tables) one besides the other each one with its caption and number.

The code to implement these features is a modification of the LaTeX 2ε package `floatfig` [2], still being developed (presumably?) under the new name `floatflt` [1].

The package has been modified to comply with JHEP requests and to correct the following problems: incompatibility with a `\marginpar`; in two-side mode floats to the following page retained the previous (wrong) position; floats were not typeset at top of page.

7.2 Hyper-features

Unless the `nohyper` option is issued (same as `paper`) the following hyper-features are activated:

Email. A new command:

`\email{`*user@address*`}`

It inserts a `mailto:user@address` link in the document to send directly e-mail to the author. The e-mail address is always typeset in `tt` font.

Href's. There are three new commands:

`\href{`*link*`}{`*text*`}, \name{`*tag*`}, \base{`*URL*`}`

The first two commands, the building blocks of hyperlinks, are equivalent to the HTML insertions `<A HREF="link">text</A>` and `<A NAME="tag"></A>`. The command `\base` provides the base URL, used by some hyper-viewers to allow the use of relative URL's. Lastly, a control sequence `\hash` which gives a `#`, to be used inside `\href` for linking manually inside documents.

(Notice the absence of text inside the HTML tag, to make target anchors invisible and avoid hyper-nesting problems).

Table of contents. The table of contents which appears on the second page contains hyperlinks to sections and pages. (Because the TOC is not customizable, the code has to redefine internal LaTeX commands, potentially breaking future compatibility).

Bibliography and citations. Each `\cite` carries a hyperlink to the respective item in the bibliography which appears at the end of the document. See for example [3, 2]. (As for the table of contents, compatibility is broken). All references which use the provided shortcuts, are linked to the corresponding online data on JHEP, `xxx` archives or SPIRES.

The package `cite` should not be used because, redefining internal commands, makes `\cite` no longer hyper-active.

Pages. Every page carries a target `NAME=pag`*n* at the top left corner.

Refs. In addition to the usual behavior, the three commands `\label`, `\ref`, `\pageref` are hyper-active: `\label{`*mylabel*`}` inserts an HTML `<A NAME=ref-mylabel>` tag into the text, again with zero width. The `\ref{`*mylabel*`}` command then carries a link to it. Also the `\pageref{`*mylabel*`}` command generates a link to the correct page (see the link to figure 1 on page 8 or to eq. B.3 on page 14). There is also a new command:

`\textref{`*mylabel*`}{`*text*`}`

The argument *text* becomes a link to the given label. This can be used to produce HTML-like text links, but should be used sparingly, in view of the paper version. As an example of an internal link see the same picture.

If you have set your WWWBROWSER environment variable, or are running nDVI, you can follow the links to other documents.

7.3 Draft

The `draft` mode provides the following features, in addition to the usual `\overfullrule`:

Processing info. The heading shows various processing information: class options, job name, time and date of processing.

Citations. For each `\cite` command the corresponding citation labels are reported in a margin note if possible, or locally.

Labels. At each `\label` command the corresponding label is reported in the margin if possible, or locally. (See appendix C, eq. B.2 or table 4).

List of figures (tables). The commands `\listoffigures` and `\listoftables` work only in draft mode. If you use them you have to provide optional arguments to the captions the will appear in the lists.

7.4 Acknowledgments

`\acknowledgments` This command starts a new section where acknowledgments can be placed. It usually resides at the end of the introduction or at the end of the paper. In fact:

A. Command summary

Preamble commands. Commands to build the title page:
- `\title{...}`: to declare the title.
- `\author{names\\addr}`: to supply names of authors and a single address. More commands must be used for different addresses. Further `\\`'s in `addr` can be used to break lines in the address.
- `\thanks{...}`: should be used inside `\author` to provide further information. It generates a footnote in the titlepage.
- `\abstract{...}`: provides the abstract.
- `\preprint{...}`: provides the preprint numbers, which are typeset in the upper right-hand corner.
- `\keywords{...}`: provides the keywords, which appear below the abstract. They are hyper-linked to the appropriate search engine in JHEP. Separate with commas.
- `\dedicated{...}`: a dedication is inserted on the right hand-side, below the keywords.

Tables and figures. To generate floating tables and figures, which are in-text if sufficiently narrow.
- `\TABLE[pos]{...}`: generates a table object. It can be any 'horizontal' material. `\caption` can be used inside it.
- `\FIGURE[pos]{...}`: generates a floating in-text figure, similar to `\TABLE`.

- \TABULAR[pos]{align}{...}{capt}: generates a full table, with align are the column definitions as in tabular, ... the table entries, and capt the caption.
- \EPSFIGURE[pos]{filename}{capt}: generates a figure from the EPS file filename.
- \DOUBLETABLE[pos]{\begin{tabular}...\end{tabular}}
  {\begin{tabular}...\end{tabular}}{capt1}{capt2}: produces two paired tables each with its caption and number.
- \DOUBLEFIGURE[pos]{filename1}{filename2}{capt1}{capt2}: generates two paired figures each with its caption and number.

Hyper commands. The usual LaTeXcommands for citations, labels, references, are hyperactive unless the nohyper or paper option is used to prepare the paper version. New specific commands are:
- \href{url}{text}: this command can be used to link text directly to some URL.
- \name{tag}: in case the author wants to insert a personal HTML tag in the document.
- \base{url}: some hyper-readers support relative URLs, and \base provides the base.
- \textref{label}{text}: it is equivalent to the \ref command; this links text to the point where label is used.

Journals. The following shortcuts for high energy physics journals are provided, and authors are encouraged to use them. They all require three arguments which are, in order, the volume number, the year *(four digits)* and the page. All macros will create links to the article in the SPIRES database. For JHEP, the three arguments are: the month (two digits), the year (four digits) and the journal number (three digits). The link for JHEP will be pointed to the official publication site.

```
\apa   -> Acta Phys. Austriaca          \dmj   -> Duke Math. J.
\apas  -> Acta Phys. Austriaca, Suppl.  \epjc  -> Eur. Phys. J. C
\appol -> Acta Phys. Polon.             \epjd  -> Eur. Phys. J. Direct. C
\advm  -> Adv. Math.                    \epl   -> Europhys. Lett.
\adnp  -> Adv. Nucl. Phys.              \forp  -> Fortschr. Phys.
\adp   -> Adv. Phys.                    \faa   -> Funct. Anal. Appl.
\atmp  -> Adv. Theor. Math. Phys.       \grg   -> Gen. Rel. Grav.
\am    -> Ann. Math.                    \hpa   -> Helv. Phys. Acta
\ap    -> Ann. Phys. (NY)               \ijmpa -> Int. J. Mod. Phys. A
\araa  -> Ann. Rev. Astron. & Astrophys. \ijmpb -> Int. J. Mod. Phys. B
\arnps -> Ann. Rev. Nucl. Part. Sci.    \ijmpc -> Int. J. Mod. Phys. C
\asas  -> Astron. Astrophys.            \ijmpd -> Int. J. Mod. Phys. D
\asj   -> Astron. J.                    \ijtp  -> Int. J. Theor. Phys.
\app   -> Astropart. Phys.              \invm  -> Invent. Math.
\apj   -> Astrophys. J.                 \jag   -> J. Alg. Geom.
\baas  -> Bull. Am. Astron. Soc.        \jams  -> J. Am. Math. Soc.
\bams  -> Bull. Am. Math. Soc.          \jap   -> J. Appl. Phys.
\blms  -> Bull. London Math. Soc.       \jdg   -> J. Diff. Geom.
\cjm   -> Can. J. Math.                 \jgp   -> J. Geom. Phys.
\cqg   -> Class. and Quant. Grav.       \jhep  -> J. High Energy Phys.
\cmp   -> Commun. Math. Phys.           \jmp   -> J. Math. Phys.
\ctp   -> Commun. Theor. Phys.          \joth  -> J. Operator Theory
\cag   -> Commun. Anal. Geom.           \jpha  -> J. Phys. A
\cpam  -> Commun. Pure Appl. Math.      \jphc  -> J. Phys. C
\cpc   -> Comput. Phys. Commun.         \jphg  -> J. Phys. G
```

```
\lmp   -> Lett. Math. Phys.          \prep  -> Phys. Rept.
\ncl   -> Lett. Nuovo Cim.           \prl   -> Phys. Rev. Lett.
\matan -> Math. Ann.                 \phys  -> Physica
\mussr -> Math. USSR Izv.            \plms  -> Proc. London Math. Soc. B
\mams  -> Mem. Am. Math. Soc.        \pnas  -> Proc. Nat. Acad. Sci.
\mpla  -> Mod. Phys. Lett.           \ppnp  -> Prog. Part. Nucl. Phys.
\mplb  -> Mod. Phys. Lett.           \ptp   -> Prog. Theor. Phys.
\nature-> Nature                     \ptps  -> Prog. Theor. Phys. Suppl.
\nim   -> Nucl. Instrum. Meth.       \rmp   -> Rev. Mod. Phys.
\npa   -> Nucl. Phys. A              \sjnp  -> Sov. J. Nucl. Phys.
\npb   -> Nucl. Phys. B              \sjpn  -> Sov. J. Part. Nucl.
\npps  -> Nucl. Phys. (Proc. Suppl.) \jetp  -> Sov. Phys. JETP
\nc    -> Nuovo Cim.                 \jetpl -> Sov. Phys. JETP Lett.
\ncs   -> Nuovo Cim. Suppl.          \spu   -> Sov. Phys. Usp.
\pan   -> Phys. Atom. Nucl.          \tmf   -> Teor. Mat. Fiz.
\pla   -> Phys. Lett. A              \tmp   -> Theor. Math. Phys.
\plb   -> Phys. Lett. B              \ufn   -> Usp. Fiz. Nauk.
\pr    -> Phys. Rev.                 \ujp   -> Ukr. J. Phys.
\pra   -> Phys. Rev. A               \yf    -> Yad. Fiz.
\prb   -> Phys. Rev. B               \zpc   -> Z. Physik C
\prc   -> Phys. Rev. C               \zetf  -> Zh. Eksp. Teor. Fiz.
\prd   -> Phys. Rev. D
\pre   -> Phys. Rev. E               \ibid  -> ibid.
```

For journals that are not included in this list the command \newjournal can be used, that needs five arguments as in the following example:
\newjournal{J.\ Stat.\ Phys.\ }{JSTPB}{35}{1984}{193} -> *J. Stat. Phys.* **35** (1984) 193
with the link to Slac Spires archive given by the spires-code in the second argument.

Archives. In addition, further shortcuts are provided for the xxx archives. They require one argument, that is the combination of year (last two digits), month (two digits) and archive number (three digits), totally seven digits;
\hepth -> {\tt hep-th/#1}, and all the others
\hepex, \heplat, \hepph, \accphys, \grqc, \quantph, \nlinsys, \qalg,
\alggeom, \solvint, \suprcon, \astroph, \chaodyn, \condmat.

and for math archives \Math{#1}{#2} where the first argument is for the two capital letters specification of the field and the second is the archive number, e.g.:

\Math{QA}{9901241} -> {\tt math.QA/9901241}.

For the new arXiv identifier the shortcut takes one argument which is the arXiv id (YYMM.NNNN) e.g.

\arXivid{0701.0001} -> {\tt arXiv:0701.0001}.

Notice that the shortcuts above also provide hyperlinks to the online data of the corresponding references. For example:
\cmp{108}{1987}{535} $\rightarrow$ *Commun. Math. Phys.* **108** (1987) 535;
\jhep{07}{1997}{001} $\rightarrow$ *J. High Energy Phys.* **07** (1997) 001;
\hepth{9604001} $\rightarrow$ hep-th/9604001.

B. Examples

An `eqnarray` to test draft labels and hyper-references.

$$\sum_{n=-\infty}^{\infty} x^n = \sum_{n=0}^{\infty} x^{-n} - 1 + \sum_{n=0}^{\infty} x^n \tag{B.1}$$

$$= \frac{1}{1-1/x} - 1 + \frac{1}{1-x} = 0 \,. \tag{B.2}$$

Of course the radius in eq. (B.2)...

This is the example for section 6.1, Euler's (ubiquitous) proof for the existence of God, which contains all basic operations and objects of complex algebra:

$$e^{i\pi} + 1 = 0 \,. \tag{B.3}$$

C. About flags and limits

New flags in this class which might be of some interest for advanced users, are `\if@hyper`, `\if@preprint`. They are `true` when processing a `hyper` or a `preprint` version, respectively.

As far as the code for tables and figures is concerned, some critical behavior in the formatting can arise *in draft mode.*

Especially in conjunction with other floats or when `\FIGURE` or `\TABLE` has a long caption with a label inside. The labels which should be shown on the margin could appear in the wrong order. The same for citations inside footnotes. In fact multiple labels inside a float are difficult to show, and could appear superimposed.

Other limitations can be found in the documentation of the floatflt package [1], and will be hopefully removed in the next release also for the files of this class.

D. History

Version 3.1.5 added command `\arXivid` to support the new arXiv identifer

Version 3.1.4 fixed compatibility with pdflatex

Varsion 3.1.3 fixed rare bug in kwds link.

Varsion 3.1.2 Fixed mistake in a warning about acceptance date Jacce@date.

Varsion 3.1.1 Fixed mistake in `\abstract` for 2001 papers.

Varsion 3.1.0 changed aspect of title page (published only): publisher's info, copyright info, url info — old aspect for 2001 papers — modified `\received`, `\revised`, `\accepted` commands — new command `\JHEPcopydate` to override default copyright date — new command `\JHEPspecialurl` to override default paper url — warning for copyright date — modified macros `\cmp` and `\ctp` — draft now shows 3.1

Varsion 3.0.5 Fixed unnecessary `\if@hyper` - Fixed draft now shows 3.0.

Varsion 3.0.4 Fixed `\nim` hyperlink - Fixed nesting too deep in emacs editing.

Varsion 3.0.3 fixed wrong skip name in titlepage.

Varsion 3.0.2 Fixed a problem with `\pdfoutput` from 'texlive' distribution — changed logo name logo.eps → JHEPlogo.eps.

Varsion 3.0.1 Fixed a problem with `\preprint`.

Version 3.0.0 In proceedings eliminated two column mode — font reduced from 12 to 11 pt — Theorems with dot and new command `\proof` (only for procs and published) — `\cite` & co. now work in abstract (`\abstract` is a cs, not a box) — amssymb used by default — fixed first line of `\author` — changed space around footnotes — added some glue around TOC — fixed command `\caption`, now accepts optional argument for lot's and lof's — for proceedings new command `\speaker` for procs — support for pdflatex — corrected `\textref` — not allowed `>` and `"` in labels — changed pagenumber in procs — adjusted vertical spacing in title page — message 'no toc in procs' — command `\revised` for revised papers — added `\leavevmode` in `\author` — bibliography is ragged right — Phys. Rep. → Phys. Rept. — added journals shortcuts `\apa \apas \advm \adnp \am \araa \arnps \asas \asj \apj \baas \bams \blms \cjm \ctp \cag \cpam \epjd \epl \forp \faa \grg \ijmpc \ijmpd \ijtp \invm \jag \jams \jap \jdg \jpha \jphc \ncl \matan \mussr \mams \nature \nim \ncs \pan \phys \plms \pnas \ptps \sjpn \spu \tmf \tmp \ufn \ujp` — generic shortuc for journals `\newjournal` — generic shortcut for math archives `\Math` — removed "PrHEP" from prep's bob-hook — added control for bop-hook in published — "List of Tables (Figures)" → "List of tables (figures)" — changed name of class: JHEP3.cls.

Version 2.0.3 Fixed unwanted space in journal refs.

Varsion 2.0.2 Fixed section numbers in TOC, just paper mode — PROCEEDINGS in the logo: 1 pt to the right — From now only one `\tableofcontents` is allowed — Added new refs. `\app, \appol, \dmj, \epjc, \jphg, \nuclex`.

Version 2.0.1 Option "proceeding" becomes "proceedings" : better — `\bottomfraction` becomes 0.6 — Changed some glue around sections: more sober style — Changed some `\DOUBLEFIGURE, \DOUBLETABLE` code: will have to fix it someday — Floating figures are no longer notified when set — fixed typo in `\atmp` — changed `\jhep` cit style to "J. High Energy Phys." (forced to) — Added ref. `\lmp` — Added command `\PrHEP` for bophook in proceedings.

Version 2.0.0 Added PROCEEDINGS support — Now also 10pt has been reintroduced for preprints (so 10, 11 or 12) proceedings are 10pt, published are always 12pt — Enlarged `\parindent = \tocindent` — `\topnumber`: 2 → 3 — `\bottomfraction`: .3 → .35 — Changed dimensions: .72w x .76h (= c.a. 40 lines for a4) and rationalized according to typographical rules — Text is shorter to fit into us-letter paper (sic.) — Margins: .14 or .13,.15 in two sided mode — Removed the "dot" in `\subsections`, left only in sections and appendices — Enlarged their fields in TOC, for many sections — Less glue around TOC — Less space and glue around title and authors – Sober style: less space and glue around sections and subsections — Rewrite of some figures code. Definitely solved the "persistent indentation" problem with in-text figures — Added `\DOUBLEFIGURE` and `\DOUBLETABLE` — Figures have three behaviors, in two column — Added `\atmp, \lmp, \ppnp`.

Varsion 1.3.2 Long time forgotten bugfix: Undefined references were not reported in hyper mode. You know, I never forget references.

Version 1.3.1 Restored some twocolumn settings in case one would like to go twocolumn for some pages. — Shortened `\marginparsep` 10→9pt — Corrected use of   in `\href` — Put some negative glue around the fields in titlepage, and some positive and negative one under the

author — Added a `\label{-TOC-}` in the TOC, to correct number of LaTeX runs — Removed `\markboth` in `\tableofcontents` (useless with JHEP) — Corrected space in `\cpc` — Added `\nuclth`.

Version 1.3.0 Deleted option "screen", it was like "hyper" — "paper"="nohyper" version is set to 12 pt like "hyper" version: now preprints have 11pt or 12pt, published has always 12pt — "twoside" option ignored for pulished papers. It works only for nohyper preprints — Added option "notoc" — Changed `\topfraction` .7 → .95, `\textfraction` .2 → .05, `\floatpagefraction` .5 → 1, `\textwidth`, `\textheight` (.76,.78) → (.74,.77), `\topmargin`=1 line, margins: .12 → .13, `\evensidemargin`: .13 → .14 in twoside — Put a DOT after section and subsection numbers to cope with appendices: "A. Calculation ..." — TOC is produced also for nohyper papers, and it has no dotted lines, for subsections — Changed `\arraycolsep`: 5pt → 2pt for uniform eqnarrays — "pos" optional argument works also for wide figures, it becomes the vertical latex placement — Bibliography is small, from now on. — Added `\adv` = "Adv. Phys.", `\cpc` = "Comp. Phys. Commun." `\jmp` ="J. Mat. Phys.", `\jgp` ="J. Geom. Phys.", `\hpa` ="Helv. Phys. Acta", `\npa`, `\pla`, `\pra`, b, c, e, `\mplb`, `\jetp` =" Sov. Phys. JETP", `\zetf` ="Zh. Eksp. Teor. Fiz.", `\joth` ="J. Operator Thoery", `\ijmpb` — `\jhep` becomes italic in references.

Varsion 1.2.2 Widow and club penalties are 1000 from now — Put some glue around TOC — added `\JHEP`, the "bophook" for published papers.

Varsion 1.2.1 Corrected "draft" was reporting JHEP1.0 — Figure captions → `\small`.

Version 1.2.0 Default is now "preprint", and "published" is reserved to the journal — Removed the 19xx from the years in the references shortcuts (Y2K compliance:) — Added `\cmp`, `\cqg`.

Version 1.1.1 The TOC is now intelligent: if there are no sections it does not appear. This requires 4 LaTeX runs! — Equations appearing before section 1 have a single number, no leading zero.

Version 1.1 Deleted option "final" — `\hash` works also in "nohyper" — The ~ works also in `\base` — `\hepth` and similar had 7 arguments, now only one: `\hepth{9912999}` — Keywords: link to the correct JHEP search engine (stdsearch?keywords=...) — References: All hyperactive, linked to SPIRES — "Published" specification bcomes "Accepted".

Version 1.0.1 Some adjustment in figure spacing — Persistent indentation I eliminated — References: JHEP becomes boldface.

Version 1.0 The NesTeX stream gives birth to the first JHEP.cls.

References

[1] Maths Dahlgren, *Package `floatflt`, distributed with LaTeX 2$_\varepsilon$ 96/06/01*, 1994-1996.

[2] M. Goossens, F. Mittelbach, A. Samarin, *The LaTeX Companion*, Addison-Wesley 1994.

[3] D. E. Knuth, *The TeXbook*, Addison-Wesley 1986.