

# **ATLAS Note**

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# Users guide to the ATLAS LATEX package

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The usage of the ATLAS LATEX templates and style files is documented here. The options that are available are given, as well as the packages that can be loaded using these files. Information on the setups used to test the packages is given and some help with the conversion of the document to the LATEX format needed for journal submission is included.

This document was generated using version 03-00-03 of the ATLAS LATEX package. The TEX Live version is set to 2016. It uses the option atlasstyle, which implies that the standard ATLAS preprint style is used.

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### 1 Introduction

This collection of ATLAS LATEX templates, style files and documentation can be used for papers, preprints and notes, both public and internal. All necessary files are collected in a single package called atlaslatex. The package is available from the web pages of the Publication Committee [1] and from Git [pubcom-git].

The collection replaces and hopefully improves on the previous packages. In particular it supersedes:

- atlasnote-00-04-05
- atlascover-00-00-11
- atlaspreprint-00-00-05
- atlasbib-00-00-04

Section 14 summarises the changes that have been made and how you can adapt your documents to use the new package. Section B.2 summarises the changes to the cover macros.

The package includes the atlasdoc class, useful style files and documentation of the package. The package also defines a standard ATLAS style for papers. This style should be used for paper drafts and for submission to the arXiv and the journal. This option is the default. Add the option atlasstyle=false to the atlasdoc class if you do not want to use this style. The documentation is provided as both PDF files and LATEX documents that should provide examples of how to use the package and how to write good LATEX.

The design principle is that you have a main document and the style files and atlasdoc class are in a subdirectory latex. The logos that are needed are kept in a logos directory. This subdirectories can of course be links to a centrally maintained latex directory. See below and Section 10 for how to proceed if you want to use and/or install the package in a central place.

The usual procedure is that for each document that you create, you first unpack the latest version of atlaslatex and then create your main document in the top-level directory. This structure means that it is easier to update the style files if a new version of atlaslatex is released. Each document can then be independent of the atlaslatex release.

To create a new document you can issue the commands:

```
make new [BASENAME=mydocument] [TEXLIVE=YYYY]
```

This command copies atlas-document.tex and atlas-document-metadata.tex to mydocument.tex and mydocument-metadata.tex.¹ The selected TEX Live version is set with the TEXLIVE option. The default is 2016. The make command also creates empty files mydocument-defs.sty and mydocument.bib. By default the document will be an ATLAS note. If you want it to be a paper draft, add the option PAPER to the document class. In the Makefile you should change the BASENAME to the name of your document. You can then compile your document with the command: make. Have a look at Makefile for other things you can adjust.

If you install atlaslatex in a central directory such as \${HOME}/texmf the basic command is:

```
make newtexmf [BASENAME=mydocument] [TEXLIVE=YYYY]
```

<sup>&</sup>lt;sup>1</sup> The Makefile should work for regular Linux and MacOSX distributions. For Windows, you probably have to execute the tasks in the Makefile by hand.

See Section 10 for more details.

In order to make a new document of book form like a TDR, use the command

make newbook [BASENAME=mydocument] [TEXLIVE=YYYY]

By default, this will pass the option BOOK to atlasdoc. Use make newbooktexmf for a book with atlaslatex in a central directory.

Note that you have to specify the language of your document as an option in the \documentclass command. Typical settings are

- UKenglish (or british);
- USenglish (or american).

As mentioned above the default TeX Live version is currently set to 2016. This should be the only option you have to adjust if you use different versions of LaTeX. You can always set a version lower than the one you have installed to maintain compatibility with older versions. To test compatibility with arXiv, try a setting of 2016.

As of Version 01-07-00 of atlaslatex you should include the command \maketitle after your \begin{document} if you want the document title to be printed.

Add the option at lass tyle=false to the \documentclass if you do not want to typeset your document in the ATLAS preprint style.

### 2 Title, author and document numbers

An ATLAS document usually collects a series of labels over time. These include the reference code of the analysis, e.g. BPHY-2013-04, the ATLAS note number and the CERN preprint number. In addition the abstract and title are needed on the front page of the document and also on various cover pages. The editors of the document, the editorial board members and the contributors to the analysis also need to be specified at some point.

While all this information can be collected in the main file of the document, it is probably better to put it all in a separate document. By default this file is called mydocument-metadata.tex.

### 2.1 Authors and Contributors

The supporting documentation for an ATLAS note (not the paper draft) should contain a list of the contributors to the analysis. A style file atlascontribute.sty has been written to help with the creation of such a list. The macros in the style file can also build the author list at the same time. Two basic macros are used to add names to the author list and list of contributions: \AtlasContributor and \AtlasAuthorContributor. The first macro adds a person to the list of contributors, while the second one also adds the person to the author list. I assume that in almost all cases you will want to use \AtlasAuthorContributor. Typical commands are:

```
\AtlasAuthorContributor{Joe Student}{a}{fake background estimate.} \AtlasAuthorContributor{Jane Student}{b}{top background estimate.} \AtlasAuthorContributor{John Postdoc}{a}{editor of internal note.} \AtlasContributor{Jo Helper}{useful contributions in a few places.} \affil[a]{University of Nowhere} \affil[b]{University of Somewhere}
```

If a person should be added to the author list, you also need to add an appropriate affiliation using the macro \affil. The optional argument is a letter or number that should also be given as the second argument to \AtlasAuthorContributor.

You can keep the list of authors and contributors separate by using \author for the authors and \AtlasContributor for the contributors. You print the list of contributors by giving the command \PrintAtlasContribute. Note that \PrintAtlasContribute has an argument that gives the fraction of the line width to be used for the name of the person. The list should either be printed before the table of contents or after the conclusions (i.e. where the Acknowledgements appear in a paper).

Note that authblk assumes that you will also have affiliations for each author. You can avoid them by using the syntax \author{[ ]{Author Name}}. Note that a space is needed in the optional argument. This means that a space appears between the author name and the comma after it, which is not so nice. Alternatively you can make the author list using the syntax:

\author{Joe Student \and Jane Student \and John Postdoc} and avoid the use of the authblk package by giving the option authblk=false to atlascontribute.

Note that the atlascontribute package requires that the packages array and booktabs be installed. If the list of contributors is very long, it may spread over more than one page. The tabular environment does not like this. Add the option xtab to use xtab instead. This option of course also requires that the package xtab is installed.

### 2.2 Special author lists

Sometimes a PUB note has a special author list. Hence a link to this list should be added to the front page. This can be achieved with the following code snippet that should be used for the author:

```
% \usepackage[marginal,hang]{footmisc}
% \setlength{\footnotemargin}{0.5em}
\usepackage{authblk}
\author{The ATLAS Collaboration%
\thanks{The full author list can be found at:\\
  \url{https://atlas.web.cern.ch/Atlas/PUBNOTES/ATL-PHYS-PUB-2014-YYY/authorlist.pdf}}
}
```

The first two lines are needed if you do not use the standard ATLAS preprint style. Note that atlasdoc has to be loaded with the option maketitle=false and \maketitle should be added after \begin{document}. This is the default as of Version 01-07-00 of atlaslatex.

#### 2.3 Metadata commands

The standard list of metadata commands are given below. More are available for the draft cover page when a paper, CONF note or PUB note draft is circulated to the collaboration. See template/atlas-document-metadata.tex for more details.

- \AtlasTitle{<Title>} typesets the paper title. If not given, you get either an error or a dummy title will be produced.
- \author{<Author>} typesets the paper author. If not explicitly given, 'The ATLAS Collaboration' will be used by default. Note that the \author{} command is pretty limited in case you want to display multiple author names and multiple affiliations. For this use case the authblk.sty package is provided; this is a typical example of its use:

```
\usepackage{authblk}
\renewcommand\Authands{, } % avoid ''. and'' for last author
\renewcommand\Affilfont{\itshape\small} % affiliation formatting
\author[a]{First Author}
\author[a]{Second Author}
\author[b]{Third Author}
\affil[a]{One Institution}
\affil[b]{Another Institution}
```

See also Section 2.1 if you want to combine the creation of a list of authors and contributors.

- \AtlasAbstract{<The abstract text>} typesets the abstract on the front page and cover page.
- \date{<Date>} typesets the paper date. If not explicitly given, the current date (\today) will be used.
- \AtlasVersion{<Draft Version>} displays the draft version on the front page, a DRAFT banner on all the other page headings, and adds line numbers to all text to easy commenting and reviewing. Should be included when paper draft is circulated to ATLAS. Highly recommended for all documents in the draft stage.
- \AtlasJournal {<Journal Name>} displays the phrase to be submitted to Journal Name at the bottom of the front page and on the cover page. Should be included when a paper draft is circulated to ATLAS.
- \AtlasRefCode{<Reference code>} displays the ATLAS standard reference code, e.g. BPHY-2014-03, on the front page and the cover page. Not shown on the front page if the note number is given.
- \AtlasNote{<Note number>} displays the note number for a CONF, PUB, INT or COM note, e.g. ATLAS-CONF-2014-23, on the front page and cover page. If the note number is given, the reference code is not shown.
- \PreprintIdNumber{<CERN preprint number>} displays the CERN preprint number on the front page.

- \AtlasDate{<Date>} set by the Physics Office as the date of submission of a paper.
- \AtlasJournalRef{<Journal reference>} displays the journal reference on the preprint front page. This should be used for the arXiv update after the paper has been published.
- \AtlasDOI{<Journal reference>} displays the DOI on the preprint front page. This should be used for the arXiv update after the paper has been published.
- \arXivId{<arXiv identifier>} displays the arXiv reference on the front page.

template/atlas-document.tex contains a basic skeleton that can be used to start typing a new note using the atlasdoc class. Many of the custom commands described above are used in this example file, in order to demonstrate their use.

Links to supporting documentation should also be included on the cover page of draft papers circulated to ATLAS. They can be included using \AtlasCoverSupportingNote{Short title}{CDS link}. It is also possible to give a TWiki page instead, but this is deprecated.

As mentioned above, see template/atlas-document-metadata.tex for more details.

### 3 The atlasdoc class

This document has been typeset using the atlasdoc.cls class.

The atlasdoc class can use either the standard LaTeX article class as its basis or the KOMA-Script sctartcl class. All the usual commands and options you usually use with article or scrartcl should work with it. You turn on the use of KOMA-Script with the option koma. For instance, this document has been produced using this very simple preamble:

```
\documentclass[UKenglish]{latex/atlasdoc}
\usepackage{latex/atlaspackage}
\usepackage{latex/atlasphysics}
\graphicspath{{../../logos/}{figures/}}
```

Note that the document language must be specified, otherwise babel will complain.

The LATEX packages that are used in the document are mostly specified in latex/atlaspackage.sty.

The style file latex/atlasphysics.sty defines a lot of useful macros for particles and more. See the separate document atlas\_physics.pdf [2] for details.

If you do not want to use biblatex you need to add the option biblatex=false when you include atlaspackage. Have a look at the latex/atlaspackage.sty to see how biblatex is included. In your main document you use \addbibresource in the preamble to include your .bib files. Note that the backend biber returns with an error if it finds an empty .bib file. A style file latex/atlasbiblatex.sty is available that adjusts the format of the references to the usual ATLAS conventions.

As mentioned above, you have to specify the document language as an option to atlasdoc. Several more options can be set. In the following the default option is in boldface.

atlasstyle=true|false turn on (default) or off the use of the ATLAS style for the document;

coverpage include an ATLAS draft cover page;

**cernpreprint** make the front page for a CERN preprint. The option preprint works as well, but is deprecated;

**NOTE** the document is an ATLAS note (default);

**PAPER** the document is an ATLAS paper (draft);

**CONF** the document is a CONF note:

**PUB** the document is an PUB note;

**BOOK** the document is book form like an LOI or TDR;

**auxmat** the document contains auxiliary material for a preprint;

**texlive=2016** adjust if you use an older version of T<sub>E</sub>X Live like 2011. A value less than 2013 adjusts a few biblatex options. A value less than 2012 uses txfonts.

paper=a4|letter set the paper size;

titlesize=normal|small use normal or reduced size fonts for the title page;

floatopt=true|false adjust the options (default) governing number and placement of floats on a page;

**texmf** use the syntax \usepackage{package} instead of \usepackage{latex/package} to include packages. This is needed if you install atlaslatex centrally, rather than in a latex subdirectory;

**newtx** use the newtxtext and newtxmath packages for fonts (default for TeXLive > 2012);

**txfonts** use the txfonts package for fonts instead of the default (default for older TFXLive versions);

mhchem=true|false include mhchem before xpatch to avoid an error with TEX Live 2014;

**datetop=true**|false use normal or smaller fonts on the title page;

**showframe**=true|**false** load the **showframe** package, to display frames showing the boxes for text body, header, footer and margin;

**titleextraheight=0em** extra height that could be needed for the title, if it is very long;

**copyrightoffset=0em** adjust the position of the copyright, if it is not completely correct.

The following options were removed in atlasdoc in atlaslatex 02-00-00. They are mostly still available in atlasdoc1.

maketitle=true|false turn on or off the creation of a title page within \AtBeginDocument. If the option
is false, but you still want a title, give the command \maketitle after \begin{document}. This
is the recommended way of proceeding;

**nomaketitle** do not create a title page; equivalent to maketitle=false. This option has no effect as of atlaslatex 01-07-00 of atlaslatex;

**koma=true**|false use the KOMA-Script base class scrartcl instead of article;

**letterpaper** set the paper size to letter.

**a4paper** set the paper size to A4; *This option was removed in* atlaslatex 02-00-00 – use paper=a4 instead:

**letter** set the paper size to letter. *This option was removed in* atlaslatex 02-00-00 – use paper=letter instead:

Note that the options CONF and PUB get passed to atlascover.sty as they only influence the cover pages.

The UK List of FAQ recommends changing several default LATEX options so that there are fewer problems with figure and table placement. It is certainly worth reading that page for further advice. As it is very hard to really test how well these options work they can be turned on or off in atlasdoc via the option floatopt=true|false. The default value is set to true.

As of atlasdoc Version 02-00-00, the KOMA-Scriptelements are used to create the title pages. In particular, \publishers is used for the abtract and copyright. The space and position for this may need to be adjusted, if you have a very long title. Use the options titleextraheight and copyrightoffset to make adjustments. It is very helpful to turn on the showframe option when doing this.

### 3.1 Dependencies and atlaspackage

The atlasdoc class depends on these packages, whose presence in your system is required:

- babel: become language aware;
- fancyhdr or scrpage2: defines the header for draft mode and for auxiliary material documents. fancyhdr is used for the standard LATEX classes and scrpage2 for KOMA-Script;
- fontenc: output font encoding;
- hyperref: add hyperlinks and ability to click on cross-references;
- graphicx: include graphics in the document;
- lineno: add line numbers to documents;
- newtxtext and newtxmath: the standard ATLAS document font. If this is not available, you can fall back to txfonts;
- xcolor: add colours to LATEX;
- ifthen: improved handling of conditionals.

These should be installed in any modern LATEX installation. See [3] for details on which collections are needed to get these packages for your operating system.

Note that under Ubuntu versions 12.04 and 14.04, lineno can be found in the texlive-humanities package! If you cannot find it, it is also included in latex/other. Copy it to your main directory, or to \${HOME}/texmf/tex/latex in order to make it centrally available.

Both the class atlasdoc and all style files: atlasbiblatex, atlascontribute, atlascover, atlaspackage and atlasphysics, need the package kvoptions so that they can process options where a value for an option should be set.

atlasdoc and atlascover both need hyperref. Have a look at one of these packages to see how to include it by hand. You can also simply use atlaspackage.sty

The style file atlaspackage.sty includes further packages. You can steer how many by using the option minimal, default or full. The minimal set is:

- amsmath: extra useful maths environments;
- inputenc: allow \(\text{a}\), \(\text{o}\), \(\text{g}\), \(\text{etc.}\) to be input directly;
- hyperref: add hyperlinks and ability to click on cross-references;
- placeins: adds commands to force figure and table output before a certain position in the text.

The default set adds in addition:

- booktabs: nicer tables. Use \toprule, \midrule and \bottomrule instead of \hline;
- csquotes: smart quotes that incorporate language dependence;
- siunitx: units package with extra functionality for tables;
- subfig: more than one plot in a figure;
- tocloft: extra options for typesetting table of contents etc.

Finally the full set includes further packages that may be useful:

- mhchem: chemical elements and molecules;
- rotating rotate figures, tables, etc.;
- xfrac nicer fractions;
- xtab newer version of supertabular, which allows tabular environments to go over more than one page.

The full list of options is:

**biblatex=true**|false turn on/off use of biblatex and biber/bibtex;

backend=bibtex|biber specify the backend to use with biblatex. Specify backend=biber to use biber
instead:

hyperref=true|false turn on/off use of hyperref;

**siunitx=true**|false do not include the **siunitx** package;

**eVkern=**true|**false** apply a kern of -0.1em to eV in order to move 'e' and 'V' closer together. This option is set by default if you use the txfonts fonts;

**csquotes=true**|false do not include the csquotes package;

**subcaption**=true|**false** use subcaption instead of subfig; subcaption is supposed to be a newer, better and more general package than subfig or subfigure. It is probably best to only use it with TeX Live 2012 or later;

**subfigure**=true|**false** use the deprecated package **subfigure** instead of **subfig**;

**subfig=true**|false use the somewhat deprecated package subfig;

**texlive=2016** set if you use an older version of TeX Live like 2011. A value less than 2013 adjusts a few biblatex options. A value less than 2012 uses txfonts and the old (Version 1) option names for siunitx. A value less than 2010 uses the old option names for csquotes. Use texlive=2016 to test options for arXiv submissions;

**txfonts**=true|**false** load the **txfonts** package and adjust loading of amsmath for duplicate symbols; **lineno**=true|**false** load the **lineno** package.

lineno.sty and authblk.sty are also provided in latex/other. They should be part of a standard LATEX installation though.

Depending on the font you use, you may find that the 'e' and 'V' in eV, MeV etc. are too far apart. You can pass the option eVkern to atlaspackage in order to move them 0.1em closer together.<sup>2</sup> This is the amount used in the atlasunit.sty for \gev etc. which is included by passing the option unit=true to

 $<sup>^2</sup>$  This option has no effect for TEX Live 2011 and older, as siunitx adjusted the spacing internally using the parameter eVcorra.

atlasphysics. If you use siunitx, I recommend setting unit=false, so that you use one consistent set of definitions throughout your document.

There used to be a problem using the tikz package with atlasnote. With atlasdoc this problem seems to have gone away. tikz is not included in atlaspackage. If you want to use it, just add the usual \usepackage{tikz} to your preamble.

Other packages that have been used at some point include:

savesym: needed to avoid errors if txfonts is used, as txfonts and amsmath define the same symbols; footmisc: extra footnote options. These mess up the atlasstyle settings.

### 3.2 Cover pages

The package also provides cover pages for the circulations of ATLAS drafts and for the front page for the CERN preprint version of an ATLAS paper. A further cover page is provided for a document containing auxiliary material associated with a preprint/paper. The style file can be found in latex/atlascover.sty.

If you wish to use the atlascover package with the atlasdoc class, you should usually use the coverpage option of the class:

\documentclass[coverpage,UKenglish]{latex/atlasdoc}

instead of the usual usepackage command: this will ensure that the cover page is produced before the title page of the document.

You can include atlascover with \usepackage if you prefer. In this case you need the option maketitle=false (which is the default as of Version 01-07-00 of atlaslatex) in the atlasdoc class (if you are using it) and you include the \maketitle command after \begin{document}.

The following options can be passed on to the atlascover package:

**coverpage** outputs the standard ATLAS paper draft cover page;

**CONF** the document is a CONF note;

**PUB** the document is an PUB note;

**cernpreprint** the title page should be in the form of a CERN preprint; The option preprint works as well, but is deprecated;

**auxmat** the title page for a document containing auxiliary material from a paper;

**coverfontsize** the base font size used for the cover (default is 11pt). Adjust this for long abstracts;

**twocolumn** use this option if your document is formatted in two columns;

**atlasdoc** this option is set by atlasdoc and is not usually needed by the user.

If you use atlascover standalone, use the option coverpage=true to actually output a cover page. This is necessary as of Version 01-04-00 of atlaslatex to make the use of options more consistent. As of Version 02-00-00, the options cernpreprint, preprint and auxmat are no longer available in atlascover. You should pass these to atlasdoc instead, as the title pages are now part of the main class.

Some papers have a very long abstract, such that it does not fit on the cover page. You can reduce the font size used on the cover by setting the option coverfontsize. The default value is 11pt. Try 10.5pt or 10pt instead to get the abstract onto the page.

It used to be the case that some journal styles, especially JHEP, produced an ATLAS draft cover page that was offset. You could use the options hoffset and voffset to move the text around.

JHEP needed hoffset=1in, voffset=1in.

revtex (APS journals) looked better with hoffset=-0.25in, voffset=-0.25in.

These offsets are ignored, as of Version 01-04-00 of atlaslatex, as the problems with spurious offsets have been eliminated.

The option clearpage, which used to exist, has no effect.

# 4 The ATLAS preprint style

This style should be used for the preparation of paper drafts, as well as for the submission of papers to the arXiv and journals. The journals will then convert the documents to the style appropriate for the journal. As some experience has to be gained with this package, feedback on any problems that occur with the style are very welcome.

Documents are typeset by default in the standard ATLAS preprint style. The use of this style can be turned off by using the option atlasstyle=false. This style uses KOMA-Script as the base class. Further settings include:

**Layout:** DIV=14 and an extra 5 mm for the binding;

**Paragraph:** The paragraph indentation is set to zero and there is a half-line separation between paragraphs.

**Figures and tables:** a small font size is used for the captions. Captions are not indented. They should be below both figures and tables;

**Font:** the default fonts are from the newtx package. These are very similar to txfonts that have been used up to now, but have a better spacing in a few cases;

**Section headers:** the standard serif font is used.

The default fonts for ATLAS documents are newtxtext and newtxmath. These are more modern variants of the package txfonts that has been used in ATLAS documents in the past.

In general, if you have problems with the newtx fonts, you can switch to txfonts by including the option txfonts with atlasdoc.

# 5 CERN preprint and arXiv

If you are writing an ATLAS paper and it has been approved by the collaboration, you have to make a version with the CERN preprint title page before submitting the paper to arXiv. You do this by replacing the option PAPER by cernpreprint in atlasdoc. The CERN preprint number is given via the macro \PreprintIdNumber. At the same time you should pass the option texlive=2016 to atlasdoc. This is because arXiv contains a 2016 TeX Live installation. Summarising, a typical \documentclass command would be:

\documentclass[cernpreprint,texlive=2016,UKenglish]{latex/atlasdoc}
\pdfoutput=1

The \pdfoutput command tells arXiv that a PDF file should be produced directly. You should also turn off ATLAS draft cover page – remove the option coverpage=true. If you move the class and style files to the same directory as the main file, you need to add the option texmf to the \documentclass.

You can test whether your document compiles with TEX Live 2016 by setting your PATH on lxplus to

export PATH=/afs/cern.ch/sw/XML/texlive/2016/bin/x86\_64-linux: \$PATH

Note that you should submit the bbl file and not the bib to arXiv. Depending on which journal you submit to, you should turn on or off the printing of the titles in the bibliography. Further details on how to proceed can be found on the Physics Office TWiki [4] – see the Section on 'Guidelines for paper submission'. APS journals have special requirements on the directory structure and the filenames for figures. Neither biblatex nor siunitx are available and KOMA-Script does not contain the \KOMAoptions command. See the Physics Office TWiki [4] for more information.

It also makes sense to clean up the metadata file at this point. You get rid of line numbering by making sure that neither \AtlasVersion nor \draftversion are defined. I recommend moving the relevant definitions into the main TEX file so that the metadata file is no longer needed. If you clean things up, the atlascover package is no longer needed. The metadata commands that are needed in addition to the title, author and abstract are:

- \AtlasJournal {<Journal Name>}
- \PreprintIdNumber{<CERN preprint number>}
- \AtlasDate{<Date>} set by the Physics Office
- \AtlasJournalRef{<Journal reference>} once it exists
- \AtlasDOI{<Journal reference>} once it exists
- \arXivId{<arXiv identifier>} once it exists

More details on arXiv recommendations can be found at https://arxiv.org/help/submit\_tex.

### 6 ATLAS notes

If you include the macro \AtlasNote in your preamble, the note number will be printed under 'ATLAS NOTE' at the top of your document. This can be used for any sort of ATLAS note, including CONF, PUB and INT notes.

## 7 Auxiliary material

Some papers have many pages of extra tables and plots that are mainly of use to theorists who need extra information. Such material can be collected in a separate document. The front page for this document is formatted using the auxmat option. If you use this option you should specify the arXiv preprint identifier using the macro \arXivId and the HepData record using the macro \HepDataRecord. This information is then included on the cover page in the form of clickable links.

Use of this option also adds the arXiv preprint identifier to the top of every page of the document.

If you want to create an auxiliary material document with an older TEX Live version such as 2009, use the command make auxmat TEXLIVE=2009.

### 8 Symbols in atlasphysics.sty

Many useful symbols are defined in atlasphysics.sty. While this used to be a very long file, it has now been split into several smaller files, which can be included or not using options. The definitions can be found in a separate document atlas\_physics.pdf.

### 9 atlaslatex directories and Git or SVN

There is some flexibility in how you set up your directory structure for using atlaslatex. By default the atlaslatex style files are in the latex subdirectory and the logos are in logos. This structure assumes that you will make a separate directory tree for each document that you create. If you want to include these files in Git or SVN, note that you only need to add the latex, logos and bibtex directories of the atlaslatex package to Git or SVN.

If you want use a centrally installed atlaslatex package, then you would usually unpack the atlaslatex-XX-YY-ZZ.tds.zip file into your texmf tree – see Section 10.

If you want to use another setup, you should set the variable \ATLASLATEXPATH appropriately at the beginning of your document. This would enable you to maintain a single copy of each atlaslatex version and easily switch between versions. For example, you give the command

\newcommand\*{\ATLASLATEXPATH}{../atlaslatex-01-08-00/} to use version 01-08-00 of the atlaslatex package, which you have unpacked into the directory tree ../atlaslatex-01-08-00. Such a structure makes it very easy to switch between atlaslatex versions without breaking anything!

### 10 Installation of atlaslatex in texmf tree

As discussed above, the atlasdoc class and the style files can all be found in the latex subdirectory. The template documents are usually set up to pick up the style files from there. If you want to use the centrally installed version, you should first copy Makefile and the template directory from \${HOME}/texmf/source/atlaslatex to the directory where you want to create your document. For the main document, you can then use the command make newtexmf to get a template which uses the centrally installed style files.

If you want to install the package in a central area, use the atlaslatex-XX-YY-ZZ.tds.zip file. Change your directory to \${HOME}/texmf and unzip the file there. To do it by hand you can do:

- unpack the tarball;
- copy the latex directory to \${HOME}/texmf/tex/latex/atlaslatex;
- copy the contents of the bibtex/bst and bibtex/bib directories to \${HOME}/texmf/bibtex/bst and \${HOME}/texmf/bibtex/bib, respectively.

It is more complicated to checkout part of a Git repository. Hence the method described above is the recommended way of installing atlaslatex in your texmf tree.

In the template files, you have to use the command make newtexmf or change

From	То
\documentclass{latex/atlasdoc}	\documentclass[texmf]{atlasdoc}
\usepackage{latex/atlaspackage}	\usepackage{atlaspackage}
<pre>\usepackage{latex/atlasbiblatex}</pre>	\usepackage{atlasbiblatex}
\usepackage{latex/atlascontribute}	\usepackage{atlascontribute}
\usepackage{latex/atlasphysics}	<pre>\usepackage[texmf]{atlasphysics}</pre>

If you are using traditional BibTeX you also have to change \bibliographystyle{bibtex/bst/atlasBibStyleWoTitle} to \bibliographystyle{atlasBibStyleWoTitle}

The texmf option in atlasphysics is not strictly necessary if you use the class atlasdoc, but it does not do any harm.

# 11 Platforms and LATEX versions

The atlasdoc class works both with LATEX and pdfLATEX. I recommend to use pdfLATEX and this is the default.

I would expect everything to work with TEX Live 2009 or later. You should just set the option texlive appropriately. This is best done in the document class, as the option is then passed to all other packages. Examples of changes include some option names for siunitx, and biblatex and biber were not really stable in earlier years.

If for example you have TeX Live 2009, add the option texlive=2009 to the document class. This will then include siunitx with the correct options for Version 1. It will also switch to unit=false to atlasphysics and use option txfonts in atlasdoc. If you want to use biblatex, the current default for all years is to use the bibtex backend rather than biber. You can use biber instead by passing the option backend=biber to atlaspackage.

The atlaslatex package should work under Linux, MacOSX and Windows. Details on the installations that I use for testing things and how you should set up your system can be found on the PubCom LaTEX FAQ [3].

# 12 Miscellaneous LATEX tips

#### 12.1 Line numbers

Line numbers can be printed using the lineno package, which is included by default. Line numbers are automatically turned on if you set \AtlasVersion (or \draftversion). In general, you can turn them on and off in a document by using the \linenumbers or \nolinenumbers commands. Note that if \AtlasVersion is set, you will always get line numbers on the standard title page. Hence, for CONF and PUB notes it is important to comment out \AtlasVersion in order to suppress the line numbers for the final version.

In order to avoid line numbers going slightly wrong around figures and tables, separate the figure and table environment from the rest of the text using blank lines.

If you use AMS Math LATEX environments such as align line numbering may be interrupted around the environment. Enclose the environment in a linenomath environment to fix this problem:

```
\begin{linenomath}
\begin{equation*}
  E = m c^{2}
\end{equation*}
\end{linenomath}
```

#### 12.2 Definitions

You can use \ensuremath in definitions, so that they will work in both text mode and math mode, e.g.  $\ensuremath{\Upsilon(\ensuremath{1S})}\xspace}$  to get  $\Upsilon(1S)$  in either mode (\UoneS{} or \$\UoneS\$).

I highly recommend that you also terminate every definition with  $\xspace$ , as then you can use the definitions without having to terminate them with  $\\\\\$  or  $\$ {}'.

### 12.3 Figures

Use the graphicx package to include your plots and figures. The use of older packages like espfig is deprecated. Since the graphicx package is required by the atlasdoc class, it is automatically loaded when using it, and there is no need to explicitly include it in the document preamble.

Always include your graphics file without giving the file extension. For instance, if you want to include the figure.eps file, you should use a syntax like this:

```
\includegraphics[width=\textwidth]{figure}
```

This will allow you to compile your document using either LaTeX or pdfLaTeX without changing your source file: you can in fact have both figure.eps and figure.pdf in your working directory, and the proper one will be picked up according to the processing method you choose.

Figures should be in general be made available in both eps (or pdf) and png format. Additionally, a pdf version of the plots can be useful in case pdflatex is used to produce a publication.

It is a good habit to keep your graphics files in a separate sub-directory (e.g. in figures/. In this case you can include them by mentioning it explicitly every time:

```
\includegraphics[width=\textwidth]{figures/figure}
```

or by telling the graphicx package where to look for them, by using this command:

```
\graphicspath{{figures/}}
```

If you use a modern version of TeX Live, it creates PDF files automatically from EPS files (if they do not exist) when you use pdflatex. An EPS file with the name picture1.eps will lead to a PDF file with the name picture1-eps-converted-to.pdf. If you have a lot of figures in many different directories, you may want to clean up the PDF files every so often. You can use the command make cleanepstopdf to achieve this. You should adjust the top-level figures directory in the Makefile accordingly.

### **12.4 Subfigures**

An example figure can be seen in Figure 1. The standard options to use for the positioning are htbp. If you get a couple of lines of text at the top of the page, make sure the figure is separated from the rest of the text with blank lines and/or try dropping the h option.

A figure with subfigures can be made as shown in the example of Figure 2. In this example the subfig package is used. The syntax with the subcaption and subfigure packages is very similar. The following commands were used to produce Figure 2:

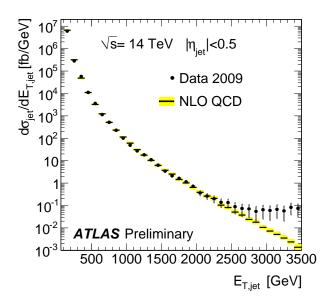


Figure 1: An example ATLAS figure.

```
\begin{figure}[htbp]
  \centering
  \subfloat[One subfigure example]{
    \includegraphics[width=0.45\textwidth]{AtlasExample}
    \label{fig:SubfigureExample1}
}
  \subfloat[Another subfigure example]{
    \includegraphics[width= 0.45\textwidth]{AtlasExample}
    \label{fig:SubfigureExample2}
}
  \caption{SubfigureExample2}
}
\caption{Subfigure example.
    \protect\subref{fig:SubfigureExample1} shows the cross-section as a function of $E_{\text{T,jet}}$ and \protect\subref{fig:SubfigureExample2} shows exactly the same thing!}
\label{fig:subfigure}
\end{figure}
```

You refer to the main figure using the usual \ref command, e.g. see Figure 2. You can refer to the subfigures using either the syntax \ref{fig:subfiglabel} (e.g. see Figure 2(b)) or \ref{fig:mainfiglabel}\subref{fig:subfiglabel} (e.g. see Figure 2(a)). Note that if you use the subfig package and want to use the labels of the subfigures in the caption, you have to use the syntax \protect\subref{fig:SubfigureExample1}. The packages subfigure and subcaption do not need protect, but it does not do any harm.

### 12.5 Positions of figures and tables

In an ATLAS paper, all figures and tables should be printed before the conclusions. You can achieve this by using the macro \FloatBarrier from the placeins package.

In general, as mentioned above, you should separate the figure and table environments from the text by blank lines. This helps the line numbers. The standard options to use for the placement are [htbp].

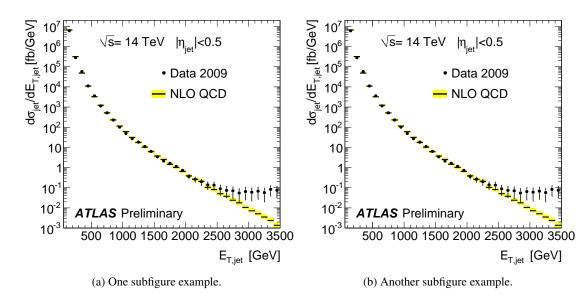


Figure 2: Subfigure example. (a) shows the cross-section as a function of  $E_{T,jet}$  and (b) shows exactly the same thing!

### 12.6 $p_{\rm T}$ or $E_{\rm T}$ – that is the question

Bold math should be automatically invoked in titles. This short section tests whether that works properly. It is of course good if things like  $p_T$  and  $E_T$  are automatically in bold face in a header and normal font in the text (and table of contents).

With the current setup, this works OK. However, if you just use the option koma, which then typesets titles using a sans serif font, the p and E are typeset with a serif font and T is typeset with a sans serif font, which is probably not what one wants! Work is still ongoing to find the optimal set of options – search for detect in the siunitx manual, to see the complete set of possibilities. This is not a problem for the ATLAS preprint style as it uses a serif font for the section titles.

### 13 Remarks on units and symbols

As discussed in the 'General guidelines for ATLAS papers' [5], it is highly recommended to use a units package to format your units properly. The package siunitx works very well and is the package of choice. Alternatives include units and hepunits, which is based on SIunits.

The basic command to use in siunitx is \SI{20}{\GeV} to get 20 GeV. There are also several other useful commands for specifying ranges: \numrange for a range of numbers and SIrange for a range of numbers with a unit. Options exist for specifying how they are formatted. The options can be set for an individual command or for the whole document. For example, in this document I have specified the options:

\sisetup{separate-uncertainty, range-units=single, list=units=single} and \sisetup{group-digits=integer, group-minimum-digits=4, detect-all}.

In addition several extra units are defined:

- \micron for \mm;
- \mrad for mrad;
- \nb for nb;
- \pb for pb;
- \fb for fb.

Use the syntax  $SI\{20.3\}\{\text{per}\fb}$  to get  $20.3 \,\text{fb}^{-1}$ .

Some things to note about using siunitx:

- It tries to isolate itself from other packages. If you just want to write GeV in your text, then you must write \si{\GeV}.
- It also contains two new column specifiers for tables "S" and "s", which are extremely useful for formatting tables properly.

The option names are somewhat different for TeX Live 2009, as this contained siunitx Version 1. You can use the older options by including atlaspackage with the option texlive=2009. You also have to turn off the inclusion of atlasunits.sty by including the option units=false with the atlasphysics package.

### 14 From atlasnote to atlasdoc

The atlasdoc class replaces and supersedes atlasnote. The decision was taken to give the class a new name, as it is supposed to be able to be used for (almost) all ATLAS documents. Some small changes in the user setup are necessary to use the new class, style files and templates.

All style files are collected in the latex subdirectory. It is assumed that this directory is a direct subdirectory of you main LATEX file. If you want to keep the style files in a central place you can either put them in \${HOME}/texmf/tex/latex or create a link from your main directory to the location of your latex directory.

The main changes the user has to make are:

- Change the class name from atlasnote to latex/atlasdoc;
- Specify the document language as an option: UKenglish or USenglish;
- Add \usepackage{latex/atlaspackage} at the beginning of the document;
- Change \usepackage{atlasphysics} to \usepackage{latex/atlasphysics};
- Use the macro \AtlasTitle instead of \title.

The language specification means that dates etc. are also formatted according to the document language. If you use the package \csquotes, quotation symbols are also consistently and properly set when you use \enquote.

All the documentation now uses biblatex and biber instead of traditional BibTeX. The templates provide information on how to make the change in your own document. The default document settings use biblatex and bibtex.

As of atlaslatex-01-00-00 the same macro names are used in both atlasdoc and atlascover so that title, journal, version number and abstract only need to be specified once. This means that if you start from an old preamble the following changes should be made:

Old	New
\title	\AtlasTitle
\draftversion	\AtlasVersion
\atlasnote	\AtlasNote
\journal	\AtlasJournal
\abstracttext	\AtlasAbstract

If you use the old macro names \draftversion, \journal, \abstracttext, they will continue to work in the document itself, but not on the cover page.

When you want to circulate a draft with cover pages, you also need to set the macro \AtlasRefCode. This replaces \AtlasCoverNumber as it is used in several places.

The class and style files have been cleaned up and things that were thought to no longer be necessary have been removed. These pieces have been collected in latex/atlasnote-obsolete.sty in case they are needed. If something important has got lost, please let me know.

The subfigure package has been replaced with subfig, as subfigure is now deprecated. If you use subfig, then you have to use \subfloat instead of \subfigure. If you want to continue to use subfigure include atlaspackage with the option subfigure=true. You should also comment out the \usepackage{subfigure}.

Similarly, if you do not want to include siunitx set the option siunitx=false.

The option \skipbeforetitle{<length>} used to set the distance between the title page header and the note title. Given that stretchable space is now used, such an option is no longer appropriate. It can be given, but will be ignored.

## A Journal templates

This section contains some information on where the LATEX templates for the different journals can be found and how to use them. However, with the advent of the ATLAS preprint style, it should no longer be necessary to format papers in the style used by the journals. This section has therefore been moved to an appendix.

The directory journal contains a very basic paper outline with the preamble needed for different journals. So far the atlaslatex package has been tested with the classes for Elsevier and APS journals and the

style file used for JHEP and JINST. You should turn off the use of biblatex if you use a journal template. Add the option biblatex=false to atlaspackage.

**Elsevier** Elsevier uses the elsarticle class which should be already installed if you have a standard TEX Live distribution. It can also be found at http://www.elsevier.com/locate/latex.

APS APS journals use REVT<sub>E</sub>X. This is also usually installed. It can also be found at <a href="https://journals.aps.org/revtex">https://journals.aps.org/revtex</a>. Note that you have to specify the author after \begin{document} with this class. Hence you should comment out the definition in your metadata file, e.g. mydocument-metadata.tex. If you want line numbers in a document typeset using REVT<sub>E</sub>X, it is best to use the class option linenumbers. In addition you should include atlaspackage with the option lineno=false.

JHEP The package can be downloaded from http://jhep.sissa.it/jhep/help/JHEP\_TeXclass.jsp. It contains a style file jheppub.sty as well as a BibTeX style file JHEP.bst.

# **B** History

Quite a lot of people have contributed to the ATLAS LATEX templates over time. Marco Delmastro set them up in the first place and added a number of improvements over time. Mike Vetterli implemented several changes to the cover pages, including switching to two pages. Cristina Oropeza, Vasia Mitsou, Chris Hays and Mike Vetterli all made contributions to the preprint cover page.

Sven Menke provided the code so that bold math works in titles correctly. Thorsten Kuhl had the idea of defining \ATLASLATEXPATH, which makes things much more flexible.

### B.1 Changes in atlaslatex-02-00-00

As of Version 02-00-00 of atlaslatex, only the KOMA-Script classes are supported. At the same time, the option BOOK was introduced, which uses scrbook as the base class. This is more suitable for long documents such as a TDR.

Several options, which make maintenance more difficult have been removed: maketitle, nomaketitle, koma. In addition, support for TEX Live versions older than 2009 has been removed. A version of the class with these options, which should still work with TEX Live 2007, but without the BOOK option is available as atlasdoc1.cls. However, the class (atlasdoc1) will not be actively maintained or developed any more. If you want to explicitly load the atlascover package, you should load atlascover1 when using atlasdoc1.

The options cernpreprint, preprint and auxmat are no longer available in atlascover. You should pass these to atlasdoc instead, as the title pages are now part of the main class.

### B.2 Changes in atlascover-01-00-00

As of atlascover-01-00-00 the same macro names are used in both atlasdoc and atlascover so that title, journal and version number only need to be specified once. This means that if you start from an old cover page the following changes have to be made:

Old	New
\AtlasCoverPaperTitle	\AtlasTitle
\AtlasCoverNumber	\AtlasRefCode
\AtlasCoverPaperVersion	\AtlasVersion
\AtlasCoverJournal	\AtlasJournal
\AtlasCoverAbstract	\AtlasAbstract

Note that atlaspreprint is integrated into atlascover and not maintained as a separate style file. To get the CERN preprint front page, you have to include the option cernpreprint when you invoke atlasdoc. If you start from an old preprint front page the following changes have to be made:

Old	New
\PreprintCoverPaperTitle	\AtlasTitle
\PreprintJournalName	\AtlasJournal
\PreprintCoverAbstract	<b>\AtlasAbstract</b>

The following changes are needed for the macros:

• The macro \AtlasCoverEdBoardMember only has one argument, as a generic email list now exists for every EdBoard.

### References

- [1] Publication Lagrange Templates,
  URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PubComLaTeX.
- [2] I. Brock, Symbols defined in atlasphysics.sty, URL: https: //twiki.cern.ch/twiki/pub/AtlasProtected/PubComLaTeX/atlas\_physics.pdf.
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  URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PubComLaTeXFAQ.
- [4] ATLAS Physics and Committees Office, URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PhysicsOffice.
- [5] ATLAS Publications Committee, *General guidelines for ATLAS papers*, URL: https://twiki.cern.ch/twiki/pub/AtlasProtected/PubComLaTeX/atlas\_paper.pdf.