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 15.3.0 of the ATLAS LaTeX package. The main class is 2023/07/07 v3.41 KOMA-Script. It uses the option atlasstyle, which implies that the standard ATLAS preprint style is used.

Contents

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 [2].

N: 09-00-00 The package should work for TeX Live versions from 2013 onwards.

N: II-JJ-KK indicates the version number of ATLAS LaTeX when new features are added.

O: II-J-KK indicates the version number when a feature is removed or made obsolete.

The collection replaces and 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`

Appendix C summarises the changes that have been made and how you can adapt your documents to use the new package. Appendix D.6 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. These subdirectories can of course be links to a centrally maintained `latex` directory. See below and Section 21 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.

2 Getting started

To create a new document you can issue one of the commands:

```
make newpaper [BASENAME=mydocument]
make newnote [BASENAME=mydocument]
```

depending on whether you want to write a paper/CONF Note/Pub Note draft or an ATLAS note draft. The command copies `atlas-paper.tex` or `atlas-note.tex` and `atlas-paper-metadata.tex`

or `atlas-note-metadata.tex` to `mydocument.tex` and `mydocument-metadata.tex`.[1] The `make newpaper|newnote` command also creates empty files `mydocument-defs.sty` and `mydocument.bib`. By default the document will be an ATLAS note draft. Use `make newpaper` for an ATLAS paper draft (including CONF and PUB notes). Replace the option PAPER with CONF or PUB as appropriate.

O: 14.0.0 Setting the `TEXLIVE` variable in the `make` command is obsolete and ignored. In the past, the selected TeX Live version was set by passing the texlive option to the document class. This is no longer necessary.

In the `Makefile` you should change the `BASENAME` to the name of your document. You can then compile your document with the command: `make`. You can try the command `make run_pdflatex` instead, which runs `pdflatex` etc. directly instead of invokes `latexmk`, a Perl script that is cleverer than the `Makefile`. You can also make this command the default. 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 one of:

```
make newpapertexmf [BASENAME=mydocument]
make newnotetexmf [BASENAME=mydocument]
```

See Section 21 for more details.

In order to make a new document of book form like a TDR, use one of the commands:

```
make newbook [BASENAME=mydocument]
make newbooktexmf [BASENAME=mydocument]
```

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).

O: 14.0.0 The default TeX Live version used to be set to 2020. This was the only option you had to adjust if you use different versions of LaTeX. A different method is now used to find out which version is being run, To test compatibility with arXiv, you should compile your document using TeX Live 2020 on `lxplus` or another machine that has this version.

N: 01-07-00 You should include the command `\maketitle` after your `\begin{document}` if you want the document title to be printed.

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

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[1] The `Makefile` should work for regular Linux and MacOSX distributions. For Windows, you probably have to execute the tasks in the `Makefile` by hand.

3 ATLAS LaTeX and the Physics Office GitLab project

With the move of ATLAS software and documents to Git, new opportunities are available to streamline the production of documents and smooth the process of submitting them to arXiv and journals. This project is called PO-GitLab in the following [3].

In order for the new tools to work smoothly some file-naming conventions should be followed. If the Physics Office set up the Git repository, the files should already have the correct names. The conventions are documented on https://gitlab.cern.ch/atlas-physics-office/gitlab-integration/wikis/newproject. For paper drafts, in short:

- the main file should have the name `GROUP-YEAR-NUM-PAPER.tex`;

- the metadata file should have the name `GROUP-YEAR-NUM-PAPER-metadata.tex`;

- the auxiliary material should be included in a file with the name `GROUP-YEAR-NUM-PAPER-auxmat.tex`

In addition:

- figures must be included using the `\includegraphics` command;

- new commands should be defined in the `GROUP-YEAR-NUM-PAPER-defs.sty` file.

4 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`.

N: 04-00-00 As the metadata needed for ATLAS notes and ATLAS papers are somewhat different, separate templates are used.

4.1 Authors and Contributors

You can include an author's ORCID using the `\AtlasOrcid` macro:
`\AtlasOrcid[0000-0002-03-9876]{John Postdoc}`. This command will be used in the ATLAS Collaboration author lists.

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`. An optional argument can be added to `\AtlasAuthorContributor`, which contains the author's ORCID. The author's name becomes a link to the ORCID. Typical commands are:

```
\AtlasAuthorContributor{Joe Student}{a}{fake background estimate.}
\AtlasAuthorContributor{Jane Student}{b}{top background estimate.}
\AtlasAuthorContributor[0000-0002-03-9876]{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 the `authblk` package 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 longtable to use `longtable`, or the option xtab to use `xtab`. This option of course also requires that the `xtab` or `longtable` package is installed.

4.2 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}}
}
```

N: 01-07-00 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}.

O: 07-00-00 In order that the footnote and the copyright statement do not overlap, you may need to pass the option copyrightoffset=1em to the atlasdoc class.

4.3 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 4.1 if you want to combine the creation of a list of authors and contributors.

  If you do not want each institute on a separate line, uncomment the lines in the metadata file:

```
\makeatletter
\renewcommand\AB@affilsepx{, \protect\Affilfont}
\makeatother
```

- \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. In the future, the steering of whether the document is a draft or not will be done using the option atlasdraft.

N: 04-03-00 If atlasdraft=true or `\AtlasVersion` is not empty, the document is declared as a draft.

- `\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.

5 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, a standard document can be produced using this simple preamble:

```
\RequirePackage{latex/atlaslatexpath}
\documentclass[UKenglish]{atlasdoc}
\usepackage{atlaspackage}
\usepackage{atlasphysics}
\graphicspath{{logos/}{figs/}}
```

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` [4] 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;

atlasdraft=true|false this is a draft version of 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;

HEPDATA a separate document with detailed tables etc. for HEPData;

texlive=0 adjust if you use an older version of TEX Live like 2013.

  O: 14.0.0 This option is obsolete and ignored.

paper=a4|letter set the paper size;

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

tocdepth=2 depth of table of contents. The default is to include subsections (2);

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

tableheading=true|false adjust table caption spacing for captions above the table;

mathlines=true|false put line numbers on equations;

linenofix=true|false fix line numbers around AMS math environments without using the `linenomath` environment;

texmf use the syntax `\usepackage{package}` instead of `\usepackage{latex/package}` to include packages.

O: 14.1.0 This option has been removed.

O: 10.0.0 With the move to the `atlaslatexpath` style file, this option is obsolete.

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 TEXLive versions);

abstract=true|false the document contains an abstract. This option is only needed together with the BOOK option, if the book does not have an abstract;

atlaslogo=true|false show the ATLAS logo on the title page;

cernlogo=true|false show the CERN logo on the title page;

keywords=true|**false** add keywords to the title page. Use the command `\AtlasKeywords` to specify them;

copyright=true|**false** replace the default copyright text. Use the command `\AtlasCopyright` to specify them;

orcidlogo=true|**false** include a visible ORCiD link in the author list;

cmslogo=true|**false** include the CMS logo on the title page;

extralogo=filename include an extra logo on the title page;

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

shownote=true|**false** show the PUB note number. This is turned off by default for the final version of PUB notes. It does not affect other document types.

datetop=true|false put the date at the top of the title page;

N: 07-00-00 No date is printed if this option is set to false;

N: 11.4.0 The option tableheading leads to better spacing of table captions above a table (the ATLAS default). With this option, and in general,you should use `\centering` and not `\begin{center}` ... `\end{center}` to centre tables and figures. If you want to place a caption explicitly you can use the macros `\captionabove` and `\captionbelow`.

N: 04-03-00 It is intended to replace using the definition of `\AtlasVersion` to decide if this a final version of a document. In a later version the default value will be set to false, so that this option simply has to be removed when a document is final.

N: 14.1.0 The option orcidlogo has been added to allow a visible ORCiD link to be shown in the author list.

N: 13.3.0 The options cmslogo and extralogo have been added to allow the CMS Collaboration logo, or another logo, to be added to the CERN preprint page next to the ATLAS logo. The logos are included with the

same height as the ATLAS logo. The extra logo should probably be added to the `logos` directory. Using the option cmslogo implies that the author and the copyright will be changed automatically. If you use the option extralogo, do not forget to adjust `\author` (and copyright) accordingly, if the paper is published together with another collaboration.

The atlaslogo and cernlogo options are for cases where a paper has a limited set of authors and so should not necessarily include these logos. In this case you may want to tweak the `hyperref` document information, the title page and also the draft label using the following commands:

```
% Author and title for the PDF file
\hypersetup{pdftitle={Limited author document},pdfauthor={J.~Smith et al.}}
% Tweak the title page
\AtlasHeading{System Paper}
\AtlasDraftHeading{DRAFT}
```

N: 15.0.0 The option keywords has been added to allow keywords to be added to the title page. You define the keywords using the `\AtlasKeywords` command. To be effective, you have to pass the keywords=true option to `atlasdoc`. It is possible to change the default copyright by passing the copyright=true option to `atlasdoc`. Use the `\AtlasCopyright` command to define the copyright text. To be effective, you have to pass the copyright=true option to `atlasdoc`:

```
\documentclass[PAPER, UKenglish, keywords=true, copyright=true]{atlasdoc}
...
\AtlasKeywords{high-energy physics, proton--proton, beyond Standard Model.}
\AtlasCopyright{\the\year \ CERN for the benefit of the ATLAS Collaboration.\newline
  Reproduction of this article or parts of it is allowed as specified in the CC-BY-4.0 license.
```

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.

The following options either have no effect or were removed.

mhchem=true|**false** include mhchem before `xpatch` to avoid an error with TeX Live 2014.

   O: 07-00-00 This option has no effect;

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

   O: 07-00-00 This option has no effect;

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

   O: 07-00-00 This option has no effect;

maketitle=true|**false** turn on or off the creation of a title page within \AtBeginDocument.

 O: 02-00-00 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

 O: 01-07-00 do not create a title page; equivalent to maketitle=false;

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

 O: 02-00-00 No longer an option.

letterpaper set the paper size to letter.

 O: 07-00-00 This option does not work anymore — use paper=letter instead;

a4paper set the paper size to A4;

 O: 07-00-00 This option does not work anymore — use paper=a4 instead;

letter set the paper size to letter.

 O: 02-00-00 This option does not work anymore — use paper=letter instead;

O: 07-00-00 KOMA-Script elements are used to create the title pages. In particular, \publishers is used for the abstract and copyright. The space and position for this may need to be adjusted, if you have a very long title. It is very helpful to turn on the showframe option when doing such adjustments.

O: 07-00-00 Use the options titleextraheight and copyrightoffset to make adjustments.

5.1 Packages, dependencies and `atlaspackage`

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

- babel: become language aware;
- scrlayer-scrpage: defines the header for draft mode and for auxiliary material documents. For TeX Live 2014 and earlier scrpage2 is used instead.
- 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;
- kvoptions: process options passed to packages.

These should be installed in any modern LaTeX installation. See [5] for details on which collections are needed to get these packages for your operating system.

If you cannot find the `lineno` package, it is also included in the **obsolete** directory. 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`, `atlasphysics` and `atlastodo` 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:

- `mathtools`: extra useful maths environments – this includes `amsmath` and some bug fixes;
- `inputenc`: allow ä, ö, ø, ß, 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;
- `cleveref`: automatically include 'Fig.', 'Section' etc. when cross-referencing;
- `bookmark`: better construction of index or outline in PDF viewers.

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

- `mhchem`: chemical elements and molecules;
- `rotating` rotate figures, tables, etc.;
- `xfrac` nicer fractions;
- `multirow` construction for table cells that span more than one row of the table.
- `longtable` newer version of `supertabular`, which allows tabular environments to go over more than one page. As an alternative you can include the use the option xtab to use the `xtab` package instead.

The above packages are all included if you turn on the full set. You can turn them on individually if you use the minimal or standard set. If you pass the xtab option, it will be included instead of `longtable`. The full option includes both the `longtable` and `multirow` packages. For TeX Live versions earlier than 2016 this will lead to an error, as the longtable option was only added to `multirow` after that.

N: 14.0 `diffcoeff` will only be included if specifically requested. It used to be part of the full option for TeX Live versions newer than 2015 (defined by the texlive option). If you want to use it with a TeX Live version before 2018, you need to pass the option diffcoeffISO=false to `atlaspackage`.

O: 12.0 If you are using an older TeX Live version (earlier than 2016), you will probably get an error when using the full option, as the `diffcoeff` package was first released in 2016. If this is the case, include the packages you want by passing the appropriate options to `atlaspackage`.

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=bibtex` to use `bibtex` instead;

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

bookmark=true|false turn on/off use of the `bookmark` package;

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

percentspace=true|**false** include or not the default space between a number and the % sign;

cleveref=true|false turn on/off use of the `cleverref` package;

capsref=true|false capitalise Section, Figure etc. when using `cleverref`;

abbrevref=true|false abbreviate Fig. etc. when using `cleverref`;

mhchem=true|**false** turn on/off use of the `mhchem` package;

diffcoeff=true|**false** turn on/off use of the `diffcoeff` package;

physics=true|**false** turn on/off use of the `physics` package;

rotating=true|**false** turn on/off use of the `rotating` package;

xfrac=true|**false** turn on/off use of the `xfrac` package;

multirow=true|**false** turn on/off use of the `multirow` package;

longtable=true|**false** turn on/off use of the `longtable` package;

xtab=true|**false** turn on/off use of the `xtab` 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`;

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

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

texlive=0 set if you use an older version of TeX Live like 2013.

  O: 14.0.0 *This option is obsolete and ignored.*

txfonts=true|**false** load the `txfonts` package and adjust loading of `mathtools`/`amsmath` for duplicate symbols;

lineno=true|false load the `lineno` package.

`lineno.sty` and `authblk.sty` are also provided in `obsolete`, just in case they are not in your standard LaTeX installation and for some reason you cannot download them from CTAN (https://ctan.org).

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.[2] This is the amount used in the `atlasunit.sty` for `\gev` etc. which is included by passing the option unit=true to `atlasphysics`. If you use `siunitx`, I recommend setting unit=false, so that you use one consistent set of definitions throughout your document.

The `siunitx` [6] package puts a (non-breaking) small space between a number and the % sign, as for any other unit. It says that this is as required by the SI system of units [7]. In Section 5.4.7 of the brochure one can find:

> The internationally recognized symbol % (percent) may be used with the SI. When it is used, a space separates the number and the symbol %. The symbol % should be used rather

---

[2] This option has no effect for TeX Live 2011 and older, as `siunitx` adjusted the spacing internally using the parameter eVcorra.

than the name 'percent'. In written text, however, the symbol % generally takes the meaning of "parts per hundred".

However, conventions between publishers appear to differ [8]. Many people are used to there being no space and this is also the ATLAS convention. Pass the option percentspace=true to include the space.

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.

5.2 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 detailed tables 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]{atlasdoc}
```

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

N: 01-07-00 You can include `atlascover` with `\usepackage` if you prefer.

O: 01-07-00 You need the option `maketitle=false` and you should 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;

LANGEDIT prints the language editor's name and email address;

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.

N: 01-04-00 If you use `atlascover` standalone, use the option coverpage=true to actually output a cover page. This makes the use of options more consistent.

N: 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`.

N: 01-04-00 These offsets are ignored, as the problems with spurious offsets have been eliminated.

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

6 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.

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`.

7 CERN preprints 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 and prepare the paper for submission to arXiv.

If your paper draft is within the PO-GitLab project, the following steps will be performed by the Physics Office using the GitLab Continuous Integration tools. Before asking the Physics Office to do this, you should check that your paper draft follows the ATLAS conventions.

In order to turn the paper into a CERN preprint, you should replace the option PAPER by cernpreprint in `atlasdoc`. The CERN preprint number is given via the macro `\PreprintIdNumber`. Summarising, a typical `\documentclass` command would be:

```
\pdfoutput=1
\RequirePackage{latex/atlaslatexpath}
\documentclass[cernpreprint, atlasdraft=false, UKenglish]{atlasdoc}
```

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 paper should include an ORCiD logo for each author in the author list pass the option orcidlogo to `atlasdoc`. If your paper should include the CMS logo, pass the option cmslogo to `atlasdoc`. If your paper should include another logo next to the ATLAS logo, pass the filename of the other logo to `atlasdoc` using the extralogo option.

You can test whether your document compiles with TeX Live 2020 by setting your PATH on `lxplus` to

```
export PATH=/cvmfs/sft.cern.ch/lcg/external/texlive/2020/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 [9] — see the Section on 'Guidelines for paper submission'. APS journals have special requirements on the directory structure and the filenames for figures. This is handled by the PO-GitLab tools.

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

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

8 ATLAS TDR and LOI documents

If you include the option BOOK, `atlasdoc` uses the `scrbook` as the document class. This option is geared to long documents such as TDRs and LOIs. Such a document has various numbers which can be set as follows:

- \AtlasRefCode: ATLAS reference code, e.g. ATLAS-TDR-099.
- \PreprintIdCode: LHCC reference code, e.g. CERN-LHCC-2017-099.
- \AtlasDate: Official date of the document.

The title will be typeset flushleft, rather than the usual centering. A typical title would be:

```
\AtlasTitle{Technical Design Report\\
for the ATLAS Detector Upgrade}
```

If you want to add images to the front and back covers, the template contains commented out commands that allow you to do this. The `pdfpages` package seems to work very well for such things. The images can be in `pdf`, `png` or `jpg` format. Unlike \includegraphics you should include the filename extension.

Note that the title page will only be correctly formatted if you use TEX Live 2013 or newer. If you are using an older version add \flushleft to \AtlasTitle.

9 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.

10 Auxiliary and HEPData material

Many papers have extra plots and tables that should be made public, but are not submitted to arXiv and the journal. These should be collected in a file `mydocument-auxmat.tex`, which is included in the draft document during its circulation within ATLAS, This is transparent for editors if they use use PO-GitLab system, but has to be done manually for other papers.

Some papers have many pages of extra tables and plots that are mainly of use to theorists who need extra information. Such material should usually included in the paper draft until it is ready for submission to arXiv and to the journal. The default name for the file containing the information is `mydocument-hepdata.tex`. At the submission stage it should be moved into a separate document. A skeleton document created using the command `make newdata BASENAME=...` The front page for this document is formatted using the HEPDATA 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.

11 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`.

12 Snippets and templates for standard text

The Publication Committee provides standard texts giving examples for the description of the ATLAS detector, and the appropriate references, as well as other text snippets that may be useful to avoid too much use of ATLAS jargon. For example, the ATLAS detector description can be found in `template/atlas-detector.tex`

You can find some text snippets that can be used in papers in `latex/atlassnippets.sty`. To use them, provide the snippets option to `atlasphysics`. Text snippets can also be found on the web pages [10]. Comments and/or suggestions on improvements are very welcome and should be given to the Publication Committee.

In addition, CP and analysis groups have started providing templates for supporting (INT) notes. These are included in a subdirectory of the `template` directory. For now (2018-10-29) there are some templates from the EXOT group.

13 Adding notes

When writing a paper, you or others often want to add notes so that things are not forgotten.

The `atlastodo` package provides a macro `\ATLnote` that can be used to define notes with separate colours for each author. This macro uses the `todonotes` package, which is also used for language editor comments. For example:

```
\ATLnote{JS}{Jane}{magenta!20}{magenta}
```

adds macros `\JSnote` and `\JSinote` for notes in the margin and inline. Note that you must use the inline variant for notes inside captions and other floating objects. Turn off the output of any notes by passing the option output=false to the `atlastodo` package.

The following options can be passed on to the `atlastodo` package:

output true|false turn off the output of any notes;

shift true|false adjust the margin to allow more space for notes;

version=2|1 version number.

If you want a list of all the notes, add `\listoftodos` somewhere in your document. The `todonotes` package also include a macro `\missingfigure` that is very useful if you want to include a figure, but do not yet have the plot.

The following code produces the paragraph below.

```
Here is an \JSnote[example paragraph]{Illustration of macro}
that shows how to use the macro. If you want a comment
without it being associated with text omit the optional argument.
\JSnote{This is a comment without associated text.}
This is some fill text between the comments.
\JSnote[Text to be improved.]{This is a comment with assoicated text.}
If you prefer your comments to be inline use the \Macro{JSinote} macro.
\JSinote{Here is an inline comment.}
```

Here is an example paragraph that shows how to use the macro. If you want a comment without it being associated with text omit the optional argument. This is some fill text between the comments. Text to be improved. If you prefer your comments to be inline use the `\JSinote` macro.

> Jane: Here is an inline comment.

O: 12.0 Version 1 of `atlastodo` had two argument: the first for the text to be commented on and the second for the comment.

N: 13.0 Version 2 of `atlastodo` has one option argument for the text to be commented on and a required one for the comment.

As mentioned above, notes in captions and other floating objects must be inline. If you include a note in a caption, you should also provide a short caption that does not include the note. If you do not you will get errors in the list of figures and/or tables. Here is an example with a short caption:

```
\caption[A nice plot.]{A nice plot. \IBinote{This need to be improved.}}
```

> Jane
> Illustration of macro
>
> Jane
> This is a comment without associated text.
>
> Jane
> This is a comment with assoicated text.

14 Language editor commands

The `todonotes` has been used to add a few macros that should be of use for language editors. The commands are in the `atlascomment` style file. This file is included if the LANGEDIT is passed to `atlasdoc`. The commands added are:

\LEecomment adds a comment about a change, or suggested change.

The commands takes two arguments: the relevant text and the explanation/suggestion.

Such comments are probably also useful for paper editors. Have a look at this style file and the `todonotes` documentation on how you can set up your own macros.

15 Scripts

Four scripts are provided in the `scripts` directory to help updating existing documents:

atlaslatex_update.sh Script to update the `atlaslatex` version to the latest master version in Git.

atlaslatex_2020.sh Script to update the `atlaslatex` version to be compatible with the 2020 version of TeX Live and LaTeX.

atlaslatex_selfupdate.sh Script to update the scripts themselves.

tex_dollars.py Script to change from use of TeX primitive `$...$` to the LaTeX macro `\(...\)`.

Have a look at the scripts for the available options.

16 Miscellaneous LaTeX tips

16.1 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`) or you pass the option atlasdraft=true to `atlasdoc`. In general, you can turn them on and off in a document by using the `\linenumbers` or `\nolinenumbers` commands. Note that if `\AtlasVersion` or option atlasdraft=true are set, you will always get line numbers on the standard title page. Hence, for papers, 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.

N: 08-04-00 Line numbering around AMS Math LaTeX environments such as `align` should just work. The code that does this is inside `atlasdoc.cls`. If this causes problems, pass the option linenofix=false to `atlasdoc`. You can set the option mathlines=false to turn off numbering the lines in equations.

For older versions of `atlaslatex`, if you use AMS Math LaTeX environments 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}
```

If you are using the environment `linenomath` you may have to set the option mathlines=false to avoid spurious line numbers.

16.2 Definitions

You can use `\ensuremath` in definitions, so that they will work in both text mode and math mode, e.g. `\newcommand{\UoneS}{\ensuremath{\Upsilon(\text{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 '`{}`'.

16.3 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 either `eps` (or `pdf`) format. `png` format can be used for event displays. However, ATLAS papers should only include `pdf` figures (and `png`). This also implies that pdfLaTeX should be used for compilation.

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.
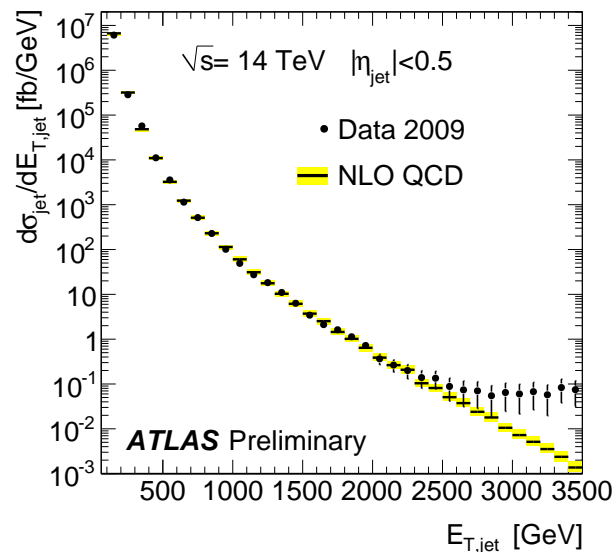
Figure 1: An example ATLAS figure.

16.4 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:

```
\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{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:subfigexample}
\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.
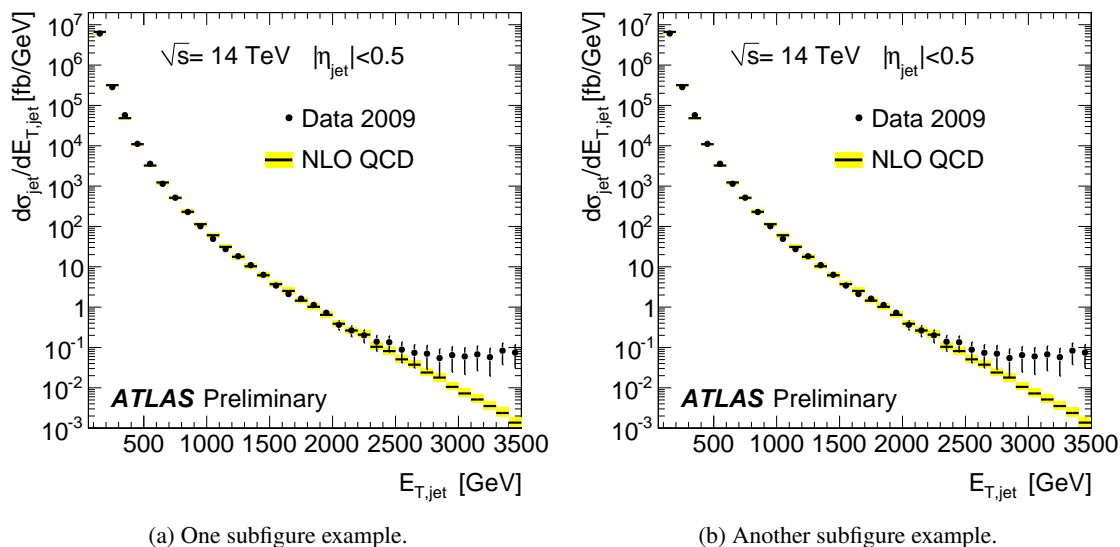
(a) One subfigure example. (b) Another subfigure example.

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

16.5 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].

16.6 Math mode macros

The correct LaTeX macros for math mode are \(...\) and not $...$ (which are TeX primitives), even though the TeX primitives are used by most people.

N: 06-00-00 The standard ATLAS bibliography and template files use the correct LaTeX macros and the documentation, example files will also be adjusted to use them.

If you are using a version of LaTeX from before 2015, you may have problems if you use the LaTeX delimiters in captions and want to make as list of tables or figures. If this is the case, just switch to TeX primitives in the caption (or subcaption).

16.7 p_T or E_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.

17 Recommended packages

A vast number of LaTeX packages are available. In this section I collect a few useful packages that I recommend using.

cleveref Means that constructs like `Fig.~\ref{fig:one}` or `\Fig{\ref{fig:one}}` are no longer necessary. Instead just use `\cref{fig:one}`. The package decides if it is a figure, table or equation and adds the appropriate text. At the beginning of sentences use `\Cref`. This package is included by default if you use `atlaspackage`. You can customise its use with the capsref and abbrevref options. If you include the package yourself, use `\usepackage{cleveref}` to get 'fig.' etc. and use `\usepackage[capitalize]{cleveref}` to get 'Fig.' etc.

heppennames A package that defines most elementary particle, mesons and baryons in a consistent way. Optionally the symbols can be upright or italic. The package is included if you pass the option hepparticle to `atlasphysics`. You can use the package `hepnicenames` instead, which uses more intuitive names for the particles, but is not as systematic.

diffcoeff A useful package for differentials.

N: 14.0.0 The package is no longer included if you pass the option full to `atlaspackage`, as its syntax has changed too often in the past years. If you pass the option diffcoeffISO=false a slanted d is used in differentials, while an upright d is used for other languages. In version 5 (released in 2023), the `\dl` command includes a small space before the differential, while there is no space on older versions. For ATLAS papers you should use the older version syntax, as arXiv uses an older version of `diffcoeff`. For this reason, the package is included in `atlaspackage` using the command `\RequirePackage{diffcoeff}[=v4]`. Hence, one should use a syntax like `\dl2{x}`, e.g. `\int f(x) \dl2{x}` gives $\int f(x)\,dx$, while `\int f(x) \dl0{x}` or `\int f(x) \dl{x}` gives $\int f(x)dx$.

Alternatives are `esdiff` and `derivative`, but the `derivative` is probably too new to be used in papers. You can use a package such as `braket` for Dirac notation etc.

The package `physics` can also be used for differentials, matrices and more. As the name suggests it is geared to physics usage. However, the LaTeX community is not very enthusiastic about the way the package is written.

The `commath` package is another alternative, but I find the `physics` package to be more reliable when different fonts are used.

todonotes Very nice package for adding notes. It is used by the `atlastodo.sty` style file. See `atlascomment.sty` for a further example.

17.1 Other (useful) packages

In this section I collect a few useful packages that may be useful when preparing a document. Note that I have only had a cursory read of their documentation, so some work amy be needed to get them working as they are supposed to.

snapshot As the first paragraph of the documentation quotes:

> The snapshot package helps the owner of a LaTeX document obtain a list of the external dependencies of the document, in a form that can be embedded at the top of the document. To put it another way, it provides a snapshot of the current processing context of the document, insofar as it can be determined from inside LaTeX.

It can also be used to arrange that the document is processed with the same versions of everything. I tried the package once, and it gave an error compiling. However, even if the compilation gives and error you can look at the resulting .dep file to get a list of all packages and versions used in a document. This may be helpful for debugging problems.

changes The changes package is another way of recording changes and adding comments. The todonotes package is used to do some of this and is integrated into the atlastodo style file. The changes is supposed to work much like change markup in LibreOffice, Microsoft Office etc.

18 Remarks on units and symbols

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 \qty{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 μm;
- \mrad for mrad;
- \nb for nb;
- \pb for pb;
- \fb for fb.

Use the syntax \qty{20.3}{\per\fb} to get 20.3 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 `\unit{\GeV}`.

- It also contains two new column specifiers for tables "S" and "s", which are extremely useful for formatting tables properly.

19 `atlaslatex` directories and Git

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 `bib` directories of the `atlaslatex` package to Git. In order to create a new document, you also need the `template` directory. For a paper, you also need the `acknowledgements` directory.

If you want use a centrally installed `atlaslatex` package, then you would usually unpack the `atlaslatex-X.Y.Z.tds.zip` file into your `texmf` tree — see Section 21.

If you want to use another setup, you should adjust the directory in `latex/atlaslatexpath.sty` appropriately. This would enable you to maintain a single copy of each `atlaslatex` version and easily switch between versions. For example, you specify: `\def\input@path{{../atlaslatex-10.0.0/latex/}}` in `latex/atlaslatexpath.sty` to use version 10.0.0 of the `atlaslatex` package, which you have unpacked into the directory tree `../atlaslatex-10.0.0`. Such a structure makes it very easy to switch between `atlaslatex` versions without breaking anything!

20 Platforms and LATEX versions

The `atlasdoc` class should in principle work both with LATEX and pdfLATEX. However, the collection is no longer tested with LATEX, so I strongly recommend to use pdfLATEX, which is the default.

I would expect everything to work with TeX Live 2013 or later. Examples of changes include some option names for `siunitx`.

N: 04-00-00 If you use the `biblatex` package, the default is to use the `biber` backend.

The `atlaslatex` package should work under Linux, macOS 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 [5].

21 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`, the `template` directory and the `bib` 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 newpapertexmf`, `make newnotetexmf` or `make newbooktemmf` 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-X.Y.Z.tds.zip` file. Change your directory to `${HOME}/texmf` and unzip the file there.

In the template files, you have to use the command `make newpapertexmf` or `make newnotetexmf` or simply comment out the line `\RequirePackage{latex/atlaslatexpath}`

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

O: 14.1.0 The texmf option in `atlasphysics` was not strictly necessary if you use the class `atlasdoc`. It has now been removed.

A Makefile

This section documents what the `Makefile` does when it creates a new document or compiles one.

When a new paper draft is created using the command
`make newpaper BASENAME=GROUP-YYYY-XX-PAPER`
the following files are created in the main directory. If a template filename is given in the table it is taken from the `template` directory, otherwise empty files are created.

template	main
`atlas-paper.tex`	`GROUP-YYYY-XX-PAPER.tex`
`atlas-paper-metadata.tex`	`GROUP-YYYY-XX-PAPER-metadata.tex`
`atlas-auxmat.tex`	`GROUP-YYYY-XX-PAPER-auxmat.tex`
`atlas-hepdata.tex`	`GROUP-YYYY-XX-PAPER-hepdata.tex`
	`GROUP-YYYY-XX-PAPER-defs.sty`
	`GROUP-YYYY-XX-PAPER.bib`

The following string substitutions are made in `GROUP-YYYY-XX-PAPER.tex`:

Old string	New string
`atlas-document`	`GROUP-YYYY-XX-PAPER`

The TeX Live version is changed to YYYY (if given). Otherwise it is set to 2020.

The same thing is done for an ATLAS supporting note made with the command
`make newnote BASENAME=GROUP-YYYY-XX-INT1`,
except that the main file template is taken from `atlas-note.tex`, the metadata template is taken from `atlas-note-metadata.tex`, and the auxiliary material and HEPData files are not created.

The standard sequence of commands to compile a document is `pdflatex, biber, pdflatex, pdflatex`. You can change the `%.pdf` target if necessary. Better is to use `latexmk` via the target `run_latexmk`. I recommend you set this as the default command.

B Journal templates

This section contains some information on where the LaTeX templates for the different journals can be found and how to use them. With the advent of the ATLAS preprint style and its use for ATLAS publications, it should no longer be necessary to format papers in the style used by the journals. However, for papers that are written by a limited number of authors the journal may require that the paper be submitted using its style.

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. The journal templates turn off the use of `biblatex` by adding the option biblatex=false to `atlaspackage`. I have not tested if it is possible to use `biblatex`.

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 REVTEX. This is also usually installed. It can also be found at https://journals.aps.org/revtex. 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 REVTEX, 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`. If the author of the paper is not the the ATLAS Collaboration, you should use the macros `\author` and `\affiliation` to specify the names and their instiutions (see the documentation) and should NOT include the `authblk` package.

JINST The package can be downloaded from https://jinst.sissa.it/jinst/help/helpLoader.jsp?pgType=author. It contains a style file `jinstpub.sty` as well as a BIBTEX style file `JHEP.bst`. The information on authors is the same as for JHEP.

C 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 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 also use `biblatex` and `biber`.

N: 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.

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.

D 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. Some problems occurred with this scheme TeX Live 2020. As a result the use of `\ATLASLATEXPATH` was replaced with the `atlaslatexpath.sty` style file.

Juan Pedro Araque has done most of the work setting up the PO-GitLab project. This resulted in a much smoother submission process for papers and an improved handling of auxiliary material.

Knut Zoch provided the code that fixed the line numbering problems with AMS Math LaTeX environments.

D.1 Changes in `atlaslatex-14.0.0`

N: 14.0.0 no longer needs or uses the texlive option, which used to be passed to the document class.

Internally `\@ifpackagelater` and `\@ifclasslater` are now used instead. Some of the documentation and test files do need such a variable, but this is now set only in those documents where it is needed.

The package `diffcoeff` is no longer included when the full is passed to `atlaspackage`, as its syntax and options have changed too often.

D.2 Changes in `atlaslatex-10.0.0`

N: 10.0.0 switches to Semantic Versioning.

The major change in this version is in the way that the class and style files are included. This had to be changed as the result of a bug introduced in the October 2020 update of LaTeX. The LaTeX update led to options being ignored when passed to a document class or a style file, if the filename contained a directory. While this bug will probably be fixed at some point, it in general appears to be better to adjust the macro `\input@path` to specify the directory that should be searched for the ATLAS LaTeX packages. Hence a new style file `atlaslatexpath.sty` has been introduced and should be loaded using

```
\RequirePackage{latex/atlaslatexpath}
```

before the `\documentclass`.

This change implies that all main files have to be updated. A script `scripts/atlaslatex_2020.sh` is provided that should make the necessary changes.

D.3 Changes in `atlaslatex-05-00-00`

N: 05-00-00 is the first version set up to be fully compatible with the PO-GitLab scheme for papers.

Separate (dummy) files for auxiliary material and HEPData tables are created for new papers. The `make auxmat` command has been renamed to `make newdata`, as the auxiliary material for the webpage is now separated from a separate file for tables etc. for HEPData.

D.4 Changes in `atlaslatex-04-00-00`

N: 04-00-00 The `Makefile` for `atlaslatex` has been restructured to reduce duplications and make separate commands for a new paper and a new note. `biber` is now the default backend for `biblatex`, as this allows the use of the 'related' field for Errata. Errata are included in the ATLAS bibliography file. Metadata for notes and papers are now separate templates to prepare for them being created directly from Glance. This is the first version that is designed for the Glance/Git integration. As the above changes are quite major, there is a jump in the main version number.

D.5 Changes in `atlaslatex-02-00-00`

N: 02-00-00 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.

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.

D.6 Changes in `atlascover-01-00-00`

N: 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`	`\AtlasAbstract`

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 LATEX Templates*,
URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PubComLaTeX
(cit. on p. 4).

[2] *ATLAS LATEX style files and templates in Git*,
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[3] *ATLAS LaTeX Documents, Git and Continuous Integration*,
     URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/AtlasLaTeXGit
     (cit. on p. 6).

[4] I. Brock, *Symbols defined in `atlasphysics.sty`*, URL: https://twiki.cern.ch/twiki/pub/AtlasProtected/PubComLaTeX/atlas_physics.pdf
     (cit. on p. 10).

[5] *PubCom LaTeX FAQ*,
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[6] *The International System of Units (SI)*,
     URL: http://www.ctan.org/tex-archive/macros/latex/contrib/siunitx
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[7] *siunitx – A comprehensive (SI) units package*,
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[8] *Should there be a space before a percent sign?*,
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[9] *ATLAS Physics and Committees Office*,
     URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PhysicsOffice
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[10] *Common pieces of text for papers*,
     URL: https://twiki.cern.ch/twiki/bin/view/AtlasProtected/PubComCommonText
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