Author Guide for AIP Conference Proceedings: Setting Up Your LaTeX 2ε Files

AIP TeX Support

tex@aip.org

Abstract. This guide provides information on the various options/functionalities available in `aip-cp` class with LaTeX for generating the papers for submission to AIP Conference Proceedings. Commands that differ from the `article` class of standard LaTeX interface, or that are provided in addition to the standard interface, are explained in this guide. This guide is not a substitute for the LATEX manual itself but should be used together with an introductory manual on LaTeX, e.g., see Ref. [7].

INTRODUCTION

The `aip-cp` class is a LaTeX document class for AIP Conference proceedings and other documents with similar layout requirements. `aip-cp` class is primarily based on the default `article` class. This class depends on the following packages for its proper functionality:

- `natbib.sty` for citation processing;
- `graphicx.sty` for graphics inclusion;
- `txfonts.sty` optional font package, if document is to be formatted with Times and compatible math fonts;
- `hyperref.sty` optional packages if hyperlinking is required in the document.

These packages are part of any standard LaTeX installation. Furthermore, users are free to make use of AMS math packages such as `amsmath.sty`, `amsthm.sty`, `amssymb.sty`, `amsfonts.sty`, etc., if they want to. Authors can use these packages as per their specific requirements.

The class provides essentially the same markup as implemented by LaTeX standard article class. In addition to this, it implements the following:

- extended set of front matter commands,
- allows mixing column and page-wide floats without getting the numbering out of sync,
- footnotes will appear below bottom floats,
- extended set of citation commands if the natbib system is installed,
- support for table notes.

USING THE `aip-cp` CLASS

If the file `aip-cp.cls` is not already in the appropriate system directory for LaTeX files, either place the file there or copy it to your working directory. In order to use the `aip-cp` class, replace `article` by `aip-cp` in the `\documentclass` command at the beginning of your document:

```
\documentclass{article}
```

is replaced by

```
\documentclass{aip-cp}
```

In general, the following standard document style options should not be used with the `aip-cp` class:

1. 10pt, 11pt, 12pt unavailable;
2. twoside (no associated style file) twoside is the default;
3. fleqn, leqno, titlepage should not be used.

Additional Document Class Options

Please place any additional command definitions at the very start of the LATEX file i.e., before the \begin{document}. For example, user-defined \def and \newcommand commands that define macros for technical expressions should be placed here. Other author-defined macros should be kept to a mininum.

The following additional class options are available with the `aip-cp` class file:

- **Paper Size**—`aip-cp` class fully supports both the US letter (8.5in × 11in) and A4 (210mm × 297mm) paper sizes.
  - `letterpaper`: Instruct the system to generate the output on US letter sized paper (default).
  - `4apaper`: Instruct the system to generate the output on A4 sized paper.

  Changing the paper size in the standard conference modes will not alter the typesetting of the document—only the margins will be affected.

- **Citations and Bibliography**—The `aip-cp` class provides the following options for Citations and Bibliography:
  - `author-numerical (default)`: This optiopn generates the numbered bibliography in text as well as at the end of the papers.
  - `author-year`: With this option, system will generate the output in author/year scheme. In combination with `natbib.sty`, the `aip-cp` class also provides some expended commands.

- **Heading numbers**—Heading numbers can be turned on or off with the following two options:
  - `numberedheadings`: Headings are numbered.
  - `unnumberedheadings`: Headings are unnumbered (default).

- All options of `article.cls` can be used with this document class.

Front matter

```
\title{The Title Goes Here with Each Initial Letter Capitalized}
```

All the authors appear as single group with footnote marker for the affiliation's appearing in a separate group. Below is an example of the same:

```
\author[aff1]{Author's Name\corref{cor1}}
\eaddress[url]{http://www.aptaracorp.com}

\author[aff2,aff3]{Author's Name}
\eaddress{anotherauthor@thisaddress.yyy}

\affil[aff1]{Replace this text with an author's affiliation
   (use complete addresses). Note the use of superscript ''a'' to indicate
   the author's e-mail address below. Use b), c), etc.
   to indicate e-mail addresses for more than 1 author.}
\affil[aff2]{Additional affiliations should be indicated by
  superscript numbers 2, 3, etc. as shown above.}
\affil[aff3]{You would list an author's second affiliation here.}

\corresp[cor1]{Corresponding author: your@emailaddress.xxx}
```

Supported commands will be \corresp[<label>]{corresponding text} with optional argument to generate number, \corref{<label>} will generate cross-ref for author, \eaddress{e-mail} is for providing author's email, another variant for \eaddress is with optional argument to specify the author's homepage as \eaddress[url]{http://www.aip.org}

```
\maketitle
```

This command inserts the actual front matter data. It has to follow the above declarations before the `abstract` environment.

```
\begin{abstract}
```

At the beginning of your article, the title should be generated in the usual way using the command. The abstract should be enclosed within an abstract environment. The coding for the same is as follows:

```
\maketitle
\begin{abstract}
We study
.
.
\end{abstract}
```

Cross-references

For cross-references of figures, tables, equations, etc., the pair of commands `\label` and `\ref` is available. Since the usage of these two commands is exactly the same as that in the standard LaTeX, we leave the explanation about `\label` and `\ref` to adequate instructions of LaTeX. Since headings in this layout do not carry numbers they cannot be referenced either.

Lists

The `aip-cp` supports all standard list environments like `itemize`, `enumerate`, etc.

```
Bullet List
\begin{itemize}
\item first bulleted item
\item second bulleted item
\end{itemize}
```

- first bulleted item
- second bulleted item

```
Numbered List
\begin{enumerate}
\item first numbered item
\item second numbered item
\end{enumerate}
```

1. first numbered item
2. second numbered item

Floating Bodies

Most publications contain figures and tables, these elements need special treatment, because they cannot be broken across pages. The solution to this requirement is to float any figure or table that does not fit on the current page to a later page, while filling the current page with body text.

LaTeX offers two environments for floating bodies: one for figures and one for tables. To take full advantage of these two environments, it is important to understand approximately how LaTeX handles floats internally.
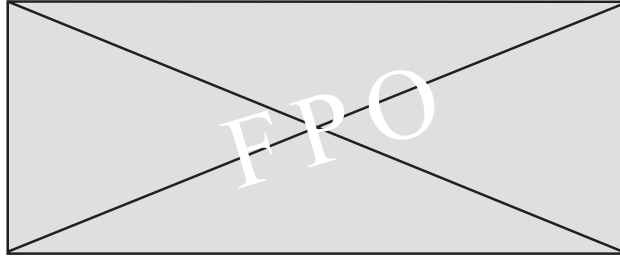
FIGURE 1. While it is possible to extend our within-household model to include multiple infecteds, this would be very tedious.

Figures

The `aip-cp` class will address the positioning of your figures and therefore you should not normally use the optional positional qualifiers on the figure environment that would override these decisions.

Figure captions should be *below* the figure itself, therefore the `\caption` command should appear after the figure or space left for an illustration. For example, Figure 1 is produced using the following commands:

```
\begin{figure}
  \centerline{%
  \includegraphics
   [width=.75\textwidth]{art/fig_1}}
 \caption{While it is possible to extend our within-household model to
include multiple infecteds, this would be very tedious.}
 \label{fig:a}
\end{figure}
```

For cross-referencing of figures using the `\label` and `\ref` commands is encouraged. For example, in referencing Figure 1 above, we used Figure~`\ref{fig:a}`.

Graphics Support

Support for including and manipulating graphics is provided as the standard LaTeX `graphicx` package is automatically loaded by the `aip-cp` class.

Figures can be scaled using the `[width=...]` option of the `\includegraphics` command. For example, `\includegraphics[width=.5\textwidth]{art/fig_1}`. One could also provide the absolute dimensions (e.g., `width=3in`).

Tables

The `aip-cp` class file will cope with most positioning of your tables and you should not normally use the optional positional qualifiers on the table environment which would override these decisions. Table captions should be at the top, therefore the `\caption` command should appear above the body of the table.

Table Headings

```
\tch{cols}{h-pos}{v-pos}{heading text}
```

To ease the production of tables, the command `\tch` is provided which is essentially an abbreviation for a `\multicolumn` command that additionally boldens its text argument. I.e., `cols` specifies the number of columns the `heading text` should span and `h-pos` defines the horizontal positioning of the text of the column(s), e.g., `l`, `r`, `c`, or `p{...}`. In contrast to a simple `\multicolumn` command the `heading text` can be split vertically by using `\\` to denote the line breaks. The `v-pos` argument should contain either `t`, `c`, or `b` denoting the vertical placement of the text in relation to other cells of that row. It is relevant if the `heading text` consists of more than one line. This demonstrates the use of this command.

Table Notes

```
\tablenote[t1n1]{Table note text}
```

Command to produce a note to the table. It can be used after the `tabular` environment or table body. The command contains the table note text with optional label (id) to produce the numbered note. If the number is not required, omit the `<label>` and use `\tablenote{Tablenote text}`. The default number of table note is $*, \dagger, \ddagger, \S, \P, \|, **, \dagger\dagger$, etc.

```
\tabnoteref{t1n1}
```

`\tabnoteref` command is used for cross-referencing of the table note and should be used in the table body. The `<label>` will determine the referencing number/symbol. Multiple `labels` can be used separated with comma as `\tabnoteref{t1n1,t2n2}`. Please note that every `<label>` should be unique for correct cross-referencing.

`\hline` can be used for horizontal lines to separate the `caption`, `table head`, `table body`, and `table note` eachother respectively.

Typically the body of the environment would consist of a `tabular` environment responsible for producing the actual table including the table and stub headers.

An example showing the use of all commands described above is shown in Table 1.

As with figures, cross-referencing of tables is also encouraged. For example, we would reference Table 1 using `Table~\ref{tab:a}`. Label of Table must be given after the `\caption` for correct numbering in the cross-referecing.

For example, Table 1 is produced using the following coding.

```
\begin{table}
\caption{Average turnover per shop: by type of retail organisation
\label{tab:a}}
\begin{tabular}{lcccc}
\hline
  & \tch{1}{c}{b}{Single\\ outlet\tabnoteref{t1n1}}
  & \tch{1}{c}{b}{Small\\ multiple}
  & \tch{1}{c}{b}{Large\\ multiple}
  & \tch{1}{c}{b}{Total} \\
\hline
1982 & 98  & 129 & 620    & 847\\
...
1998 & 200 & 300 & 1500\tabnoteref{t1n2}  & 2000\\
\hline
\end{tabular}
\tablenote{This is an example of unnumbered tablenote entry}
\tablenote[t1n1]{This is an example of first numbered tablenote entry}
\tablenote[t1n2]{This is an example of second numbered tablenote entry}
\end{table}
```

Landscaping pages

If a table/figure is too wide to fit the standard measure, it may be turned, with its caption, to 90 degrees. Landscape tables/figures cannot be produced directly using the `aip-cp` class file because LATEX itself cannot turn the page, and not all device drivers provide such a facility. The following procedure can be used to produce such pages.

TABLE 1. Average turnover per shop: by type of retail organisation

	Single outlet*	Small multiple	Large multiple	Total
1982	98	129	620	847
1987	138	176	1000	1314
1991	173	248	1230	1651
1998	200	300	1500†	2000

This is an example of unnumbered tablenote entry
* This is an example of first tablenote entry
† This is an example of second tablenote entry

Use the package `rotating` in your document and change the coding from

```
Figures
        \begin{figure}....\end{figure}

\begin{sidewaysfigure}....\end{sidewaysfigure}

Tables
        \begin{table}....\end{table}
\begin{sidewaystable}....\end{sidewaystable}
```

Long tables

Tables which are longer than one page cannot be placed into a `table` environment as floats cannot have a size larger than a page. Such tables are supported by the standard LaTeX package `longtable` written by David Carlisle. Refer to the package documentation for the syntax description.

Footnote

LaTeX provides `\footnote` command to generate the footnoote.[1] It can be produced by

```
\footnote{This is an example of footnote.}
```

Typesetting mathematics

LaTeX allows two writing modes for mathematical expressions: the **inline mode** and the **display mode**. The first one is used to write formulas that are part of a text. The second one is used to write expressions that are not part of a text or paragraph, and are therefore put on separate lines.

Inline Mathematics

To put your equations in inline mode use one of these delimiters: `\( \)` or `$ $`.

Displayed Mathematics

The `aip-cp` class supports all the standard features in this respect. `aip-cp` class set displayed mathematics with center to the text width. The *displayed* mode has two versions: numbered and unnumbered. Below are examples for both:

---

[1] This is an example of footnote.

```
Unumbered Equation
\[
  \phi_{d_{f}} (\mathbf{r}) = \sum_{i} d^{f}_{i} \phi_{i} (\mathbf{r}).
\]
```

$$\phi_{d_f}(\mathbf{r}) = \sum_{i} d_i^f \phi_i(\mathbf{r}).$$

```
Numbered Equation
\begin{equation}
R_K^{F/J} (\rho) \approx \frac{1}{\mu} \left[  H_K + \frac{\rho}{2(1-\rho)}
\left(\sum_{i=1}^K \frac{1}{i-\rho} + (1-2 \rho)\sum_{i=1}^K \frac{1}{i(i-\rho)}
\right) \right].
\end{equation}
```

$$R_K^{F/J}(\rho) \approx \frac{1}{\mu}\left[H_K + \frac{\rho}{2(1-\rho)}\left(\sum_{i=1}^{K}\frac{1}{i-\rho} + (1-2\rho)\sum_{i=1}^{K}\frac{1}{i(i-\rho)}\right)\right]. \tag{1}$$

Acknowledgments

These should appear at the close of your paper, just before the list of references. Use the acknowledgments environment, e.g.,

```
\section{ACKNOWLEDGMENTS}
The research and writing of this work was partially carried out...
```

Bibliography

Referring to other articles, books, etc. can be done using the \cite command of standard LaTeX. The list of references itself can either be produced using standard LaTeX methods or using BiBTeX.

For this, we recommend the use of natbib.sty after the \documentclass{aip-cp} declaration. The natbib system has two basic citation commands, \citet and \citep for *textual* and *parenthetical* citations, respectively. There also exist the starred versions \citet* and \citep* that print the full author list, and not just the abbreviated one. All of these may take one or two optional arguments to add some text before and after the citation. The following table shows some examples:

Commands		Author-Year Style		Numerical Style
\citet{jon90}	⇒	Jones et al. (1990)	⇒	Jones et al. [21]
\citet[chap.~2]{jon90}	⇒	Jones et al. (1990, chap. 2)	⇒	Jones et al. [21, chap. 2]
\citep{jon90}	⇒	(Jones et al., 1990)	⇒	[21]
\citep[chap.~2]{jon90}	⇒	(Jones et al., 1990, chap. 2)	⇒	[21, chap. 2]
\citep[see][]{jon90}	⇒	(see Jones et al., 1990)	⇒	[see 21]
\citep[see][chap.~2]{jon90}	⇒	(see Jones et al., 1990, chap. 2)	⇒	[see 21, chap. 2]
\citet*{jon90}	⇒	Jones, Baker, and Williams (1990)	⇒	[21]
\citep*{jon90}	⇒	(Jones, Baker, and Williams, 1990)	⇒	

For more information regarding these commands, the authors can refer to the documentation of natbib package.

Bibliography Produced Manually

In `aip-cp` class, `\begin{thebibliography}{}` ... `\end{thebibliography}` command can be used to produce bibliography. The coding is as follows:

```
\begin{thebibliography}{1}
\bibitem{man:aipproceed}
American Institute of Physics, \emph{Conference Proceedings: Instructions for
  Camera Ready Manuscripts}, Feb 2000.

\bibitem{man:Daly99a}
P. Daly, \emph{Natural Sciences Citations and References
  (Author--Year and Numerical Schemes)},
  1999, distributed as \textttt{natbib.dtx} with the \textttt{natbib} software.

\bibitem{man:Daly99b}
P. Daly, \emph{Reference sheet for \textttt{natbib} usage},
  1999, distributed as \textttt{natnotes.tex} with the  \textttt{natbib}
  software.
\end{thebibliography}
```

Bibliography Produced Using BibTeX

The `aip-cp` class is accompanied by BibTeX style files which can be used to produce compliant reference lists from BibTeX database files. To use BibTeX one first has to run the source file through LaTeX then run BibTeX and then rerun LaTeX twice to get all references resolved. BibTeX is described in more detail in Appendix B of Ref. [7] and in Chapter 13 of Ref. [5].

```
\bibliographystyle{style-name}
```

This declaration specifies to BibTeX that the style `style-name` should be used. It can be placed anywhere within the document but is usually positioned directly in front of the command described below.

For a AIP Conference Proceddings we recommend the use of `aipnum-cp.bst` provided with this packet. This bibliograpgy style generates numbered style references in the required format.

```
\bibliography{bib-list}
```

This command denotes the position where the reference list produced by BibTeX will be included in the document. The `bib-list` is a comma separated list of BibTeX database files.

REFERENCES

[1]   American Institute of Physics, *Conference Proceedings: Instructions for Camera Ready Manuscripts*, Feb 2000.

[2]   P. Daly, *Natural Sciences Citations and References (Author–Year and Numerical Schemes)*, 1999, distributed as `natbib.dtx` with the `natbib` software.

[3]   P. Daly, *Reference sheet for `natbib` usage*, 1999, distributed as `natnotes.tex` with the `natbib` software.

[4]   H. Kopka and P. Daly, *Guide to LaTeX*, Tools and Techniques for Computer Typesetting, Addison-Wesley, Boston, Massachusetts, 2004, 4 edn., ISBN 0-321-17385-6.

[5]   F. Mittelbach and M. Goossens, *The LaTeX Companion*, Tools and Techniques for Computer Typesetting, Addison-Wesley, Boston, Massachusetts, 2004, 2 edn., ISBN 0-201-36299-6, with Johannes Braams, David Carlisle, and Chris Rowley.

[6]   M. Goossens, S. Rahtz, and F. Mittelbach, *The LaTeX Graphics Companion*, Tools and Techniques for Computer Typesetting, Addison-Wesley, Reading, Massachusetts, 1997, ISBN 0-201-85469-4.

[7]   L. Lamport, *LaTeX: A Document Preparation System*, Addison-Wesley, Reading, Massachusetts, 1994, second edn.