APS Compuscript Guide for REVTEX 4 (Version 1.0)

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Contents

1. INTRODUCTION

The American Physical Society journals receive over 24,000 unsolicited manuscripts each year of which over 14,000 are published after peer review. The goal of the APS compuscript program is to expedite the handling of these manuscripts while reducing costs and avoiding unnecessary duplication of effort. A *compuscript* is an author-prepared electronic file that adheres to specific guidelines designed to maximize the likelihood that the manuscript will go through our editorial and production processes in as automated a way as possible. This document sets forth the current guidelines. At this time, only files prepared with REVTEX 3 or REVTEX 4 can be considered as compuscripts. Please note that using REVTEX 3 or 4 is a necessary, but not sufficient, condition for a manuscript to be a compuscript. Over the next year, REVTEX 3 will be phased out. Thus, authors should switchover to REVTEX 4 as soon as possible.

In addition to the obvious goal of publishing journals containing significant new physics with high-quality typesetting, the APS also strives to create true long-term archival versions of all that we publish. In particular, we currently produce richly tagged SGML/XML files that can be used to create online journals with robust features such as linked references and fielded searching. These SGML/XML files ultimately will be used to create online readable versions of the article with flexible formatting.

Even before journal production, the APS editorial process can make use of the information in a properly prepared manuscript. Information such as title, authors, affiliations, PACS codes, etc. can be automatically extracted and used to populate our manuscript database. References can also be culled, cross-checked for accuracy, and used to create a linked version for referees and editors. Moreover, time can be saved as referrals can be made electronically rather than by conventional mail. Thus, a well-prepared electronic manuscript can enhance the entire peer review process from author to reader while making the whole process less expensive.

One of the main design goals of REVTEX 4 was to simplify the way data is marked up in maunscripts. This means that new macros (or new ways of using old macros) have been introduced in REVTEX 4 in order to better make use of author keystrokes throughout the editorial and journal production processes. A proper compuscript should be able to go through automated processes to create richly tagged data. APS has worked with our vendors to develop tools to screen manuscripts at submission time to ensure that they are likely to convert cleanly during

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production. Manuscripts which fail to pass the screening process will not qualify as compuscripts. They will require rekeying during production which can result in errors and may result in a delay in publication. Furthermore, increased page charges (or other future charges) may apply.

The following sections detail what is required for a REVTEX 4 manuscript to qualify as a compuscript. As we improve our editorial and production processes, these requirements may change. This document will be kept up to date and the definitive version will be available at `http://publish.aps.org/revtex4/`. For more complete descriptions of how to use the REVTEX 4 macros, please see the REVTEX 4 Author's Guide included with the REVTEX 4 distribution. Questions about REVTEX 4 and compuscripts may be emailed to `revtex@aps.org`.

2. FORMATTING

2.1. Preprint vs. twocolumn

All manuscripts that are submitted to APS must format correctly under the `preprint` class option. REVTEX 4 is designed to make it straightforward to switch between two-column and single-column formatting just by changing the class option. Authors may submit with the `twocolumn` class option, but this will be changed to the `preprint` class option upon submission. It is imperative that authors check that their papers will format properly when this change is made. Papers which don't format correctly under `preprint` may be delayed or may not qualify as a compuscript at all.

The `preprint` primarily does three things: It increases the font size to 12pt, increases the line spacing, and changes the formatting to single-column. The changes in font size and spacing can cause problems. In particular, equations and tables may need to be re-formatted. Please see Section 8 for details in fixing table problems.

2.2. Paper size

Manscripts should be submitted to APS formatted for letter size paper. Papers will be sent to referees electronically and they may want to print them out. Letter size formatting ensures that this will be trouble free for all referees.

3. MARKING UP FRONT MATTER

Perhaps the most important macro changes in REVTEX 4 are those pertaining to the markup of the front matter (title, authors, affiliations, abstract, PACS codes, etc.). While the macros are very similar to the REVTEX 3 or LATEX 2_ε `article` class macros, their usage is quite different. Authors must follow the REVTEX 4 usage if they want their manuscripts to qualify as compuscripts. Note that proper use of the REVTEX 4 macros means that explicit centering environments in the front matter are not needed and must not be used.

3.1. Title

The title of the manuscript must be specified using the `\title` macro. A double backslash `\\` may be used to force a line break in a long title.

3.2. Authors, affiliations, and collaborations

The markup of authors and affiliations is perhaps the most significant change from REVTEX 3 and the LATEX `article` class. To qualify as a compuscript, the following rules must be followed.

- Each `\author` macro must contain only one author's name. REVTEX 4 automatically puts in all commas and the word 'and.'
- Use the `\surname` macro to explicitly indicate if an author's family name consists of more than one name or if the family name is not the author's last name.
- The `\email` macro may be used to specify an author's e-mail address. The `\thanks` macro must not be used for this. Only the e-mail address itself may appear in the macro's required argument.
- The `\homepage` macro may be used to specify a URL associated with an author. The `\thanks` macro must not be used for this. Only the URL may appear in the macro's required argument.
- The `\altaffiliation` macro may be used to specify an alternate affiliation or temporary address for an author. The `\thanks` macro must not be used for this. Only the affiliation may appear in the macro's required argument.
- The `\thanks` macro may be used only if one of the more specific macros list above does not apply.
- Each `\affiliation` macro must contain only a single affiliation.
- Superscripts linking authors to affiliations must be accomplished using the `superscriptaddress` class option rather than putting in explicit superscripts by hand.
- A collaboration may be specified by using the `\collaboration` macro. The `\author` macro must not be used for collaborations.

3.3. Abstract

The abstract must be specified using the `abstract` environment. Note that in REVTeX 4, the abstract must come before the `\maketitle` command.

3.4. PACS codes

If supplying suggested PACS codes, they must be supplied as a comma-separated list using a single `\pacs` macro.

4. REFERENCES AND FOOTNOTES

REVTeX 4 comes with two BibTeX style files for formatting references, one for the *Physical Review* journals, the other for *Review of Modern Physics*. Authors are strongly encouraged to use BibTeX when preparing their bibliographies. The new style files add additional markup via the `\bibinfo` macro. At this time it is not a requirement to use these BibTeX styles, but it may become one in the future. If BibTeX is used, current production processes require that the `.bbl` file be included directly into the manuscript's main `.tex` file. The following apply whether BibTeX is used or not.

- Authors must use the `\cite` and `\bibitem` macros to create bibliographies and to refer to items in the bibliography. "By hand" numbering of references is not acceptable.

- Footnotes must be specified using the `\footnote` macro. REVTeX 4 will automatically place the footnotes at the end of the bibliography by default for the Physical Review journals. Footnotes giving additional information about authors (such as e-mail addresses) must not be specified using the `\footnote` macro (see Section 3.2).

- Custom footnotes using `\footnotemark` and `\footnotetext` are not allowed (except in the context of tables (see Section 8.6))

- References should be formatted and specified according to the *Physical Review Style Guide*. Note that using BibTeX automatically ensures this.

- In journal styles that use superscript citations (*e.g.*, Phys. Rev. B), use `\onlinecite` to create references that appear on the baseline (*i.e.*, Ref. 4). For superscript citations, use the proper journal class option rather than creating superscripts by hand.

- URL's should be specified using the `\url` macro. BibTeX will automatically take care of this if the `url` field is used.

- E-print identifiers should be included using the `\eprint` macro. BibTeX will automatically take care of this if the `eprint` field is used.

5. BODY OF THE PAPER

5.1. Sectioning and cross-referencing

For sectioning a manuscript, the basic rule is to use the appropriate sectioning commands (`\section`, `\subsection`, `\subsubsection`, *etc.*). Cross-referencing a section must be done by using the proper `\label` and `\ref` commands. Cross-referencing by hand is not allowed. `\part`, `\chapter`, and `\subparagraph` should not be used.

5.2. Appendices

Appendices should be specified using the `\appendix` command which specifies that all following sections create with the `\section` commands are appendices. If there is only one appendix, then the `\appendix*` command should be used instead.

5.3. Acknowledgments

Any acknowledgments should be included by using the `acknowledgments` environment. Note that in REVTeX 4, this is now an environment and not a macro.

5.4. Counters

No counters may be created and the standard ones may not be altered. If an exceptional label is needed for an equation, the `\tag` macro (requires the `amsmath` class option) should be used.

5.5. Fonts

It is preferable to avoid the older TeX and LaTeX 2.09 macros for controlling fonts such as `\rm`, `\it`, *etc.* Rather, it is better to use the macros introduced in LaTeX 2_ε. If the older font commands are used (they really should be avoided!), be sure to use curly braces to properly limit the extent of the font change. `{\bf ...}` is the correct method. Commands for controlling text and math font changes are summarized in Table I.

Bold Greek letters and other bold math symbols should be accomplished with the use of `bm.sty` which is distributed as a required tool with the latest versions of LaTeX 2_ε and should be loaded via `\usepackage{bm}`. This package introduces the `\bm` macro. This replaces

TABLE I: LaTeX 2ε and AMS-LaTeX font summary.

\textit	Italics. Replaces \it.
\textbf	Bold face. Replaces \bf.
\textrm	Roman. Replaces \rm.
\textsl	Slanted. Replaces \sl.
\textsc	Small caps. Replaces \sc.
\textsf	Sans serif. Replaces \sf.
\texttt	Typewriter. Replaces \tt.
\textmd	Medium series.
\textnormal	Normal.
\textup	Upright.
\mathbf	Bold face.
\mathcal	Replaces \cal.
\mathit	Italics.
\mathnormal	Replaces \mit.
\mathsf	Sans serif.
\mathtt	Typewriter.
\mathfrak	Fraktur. Requires amsfonts or amssymb class option.
\mathbb	Bold blackboard. Requires amsfonts or amssymb class option.
\bm	Bold Greek and other math symbols. Requires \usepackage{bm} and may require the amsfonts class option.

the REVTeX 3 macro \bbox which is now disallowed. Some bold characters may require using the amsfonts class option.

New fonts may not be declared with \newfont. Font attribute commands for selecting a font family, shape, and series are all disallowed; the standard LaTeX 2ε font selection macros list above should be used instead.

Finally, the \symbol macro is also not allowed.

5.6. Environments

5.6.1. Lists

The standard list environments itemize, enumerate, and description are allowed. The \item macro with or without the optional argument is also allowed. Customization of the list environments (with macros such as \labelstyle, \labelitemi, \labelenumi, \itemsep, etc.) is allowed but may be ignored in production. Generalized lists (\begin{list}) and trivial lists (\begin{trivlist}) are not allowed.

5.6.2. Other Environments

Creating generalized new environments with \newenvironment is not allowed. Creating a new theorem environment with \newtheorem is allowed though.

The tabbing environment and the macros \=, \>, \`, and \' are allowed but may be ignored in production. Conversion programs used in production should recognize the escapes \a=, \a', and \a` for using the corresponding accents within a tabbing environment though.

The verbatim environment is allowed.

5.7. Boxes

Most boxes and macros to manipulate them are not allowed. These include \raisebox, \parbox, \minipage, \rulebox, \framebox, \mbox, \fbox, \savebox, \newsavebox, \sbox, \usebox and the environment \begin{lrbox}. Rules produced with \rule are not allowed.

5.7.1. Margin Notes

Margin notes created with \marginpar are not allowed, as are the associated style parameters \marginparwidth, \marginparsep, and \marginparpush.

6. MATH MARKUP

In general, all math markup and the standard math environments from LaTeX 2ε are allowed. These include \begin{math}, \begin{displaymath}, \begin{equation}, \begin{eqnarray}, and \begin{eqnarray*}. The shortcuts $, $$, \[, and \] are allowed. In addition, authors may use almost all of the additional markup introduced by AMS-LaTeX by using the amsmath class option. The explicit exceptions are \genfrac, \boxed and \smash. The markup contained in amsextra and amsthm may not be used though. Commutative diagrams created with the amscd package are acceptable.

7. FIGURES

7.1. Figure inclusions

Figures should be included into a REVTeX 4 manuscript by using the standard LaTeX 2ε macros. LaTeX 2ε includes several powerful packages for including the files in various formats. The two main packages are graphics and graphicx. Both offer a macro called `\includegraphics`; they mainly differ in how arguments for controlling figure placement (*e. g.*, scaling and rotation) are passed to the `\includegraphics`. Old LaTeX2.09 interfaces such as `epsfig` have been reimplemented on top of these packages. Use of one these mechanisms replaces the REVTeX 3 classoption `epsf`.

The `figure` environment should be used to add a caption to the figure and to allow LaTeX to number and place the figures where they fit best. If a figure needs to be referred to in the text, then rather than manually numbering the figures a `\label` should be added to the figure environment (best practice is to put the label within the `\caption` macro) and the `\ref` macro should be used to reference this label. Figures that span the page should use the `\figure*` environment. The `picture` environment must not be used directly (one can include an Encapsulated PostScript figure that was produced using the `picture` environment of course).

7.2. Figure placement

Figures should be placed as close as possible to the point where they are first referenced. There is no need to place all figures separately at the end of the manuscript and it is preferred that authors leave the figures in their natural locations. Authors may also find useful the REVTeX 4 `floatfix` class option which adds emergency float placement processing to avoid "stuck" floats which would otherwise be deferred to the end of the job (and can lead to the fatal ``` ``Too many unprocessed floats'' ``` message).

8. TABLES

The standard LaTeX 2_ε table formatting environments are supported as is the use of the `longtable` package. Tables may be reformatted during production to meet APS style guidelines.

8.1. Single column formatting

Because `preprint` formatting is used during the editorial and production processes, authors must ensure that their tables format correctly under the `preprint` option. Tables are particularly sensitive to this change because the font size and line spacing increase making tables wider and longer. This means some tables may no longer fit upon the page. It is the author's responsibility to fix this before submitting the manuscript. Here are some helpful hints:

- Use the `longtable` package to get tables to break across pages.
- The macro `\squeezetable` will reduce the font size of the table. This macro must occur within a group outside the table environment. The proper markup is:

```
\begingroup
\squeezetable
\begin{table}
...
\end{table}
\endgroup
```

- Try using the float placement option `H` which will enable LaTeX to break a float across pages. Long tables are more attractively set with `longtable` however.

```
\begin{table}[H]
\begin{ruledtabular}
\begin{tabular}
...
\end{tabular}
\end{ruledtabular}
\end{table}
```

8.2. Doubled rules and other table formatting

REVTeX 4 provides the `ruledtabular` environment which automatically puts the scotch rules (double lines) around tables and formats all enclosed `tabular` environments to the full width of the tables and improves intercolumn spacing. This environment should be used whenever possible.

8.3. Wide tables

When typesetting using `twocolumn`, tables can either span a single column or both columns. Using the '`*`'-ed version of the `table` or `longtable` environments produces wide tables that span the columns. For compuscripts, the `twocolumn` is not used at all and authors must ensure that their tables format correctly whatever environment is used.

Tables that are very wide and that may be better typeset in a landscape orientation (rotated 90 degrees) should be enclosed in a `turnpage` environment. This will place the rotated table on its own page. Note that some dvi previewers may not be able to show the table properly, but `dvips` and `pdflatex` work correctly.

8.4. Table placement

Tables should be placed as close as possible to the point where they are first referenced. There is no need to place all tables separately at the end of the manuscript and this is not desirable for APS purposes. The class option `floatfix` may be helpful for table placement as well as figure placement (see Section 7.2).

8.5. Aligning columns on a decimal point

The standard LaTeX 2_ε macro package `dcolumn` should be used to accomplish this.

8.6. Tablenotes

Footnotes in tables (tablenotes) should use the `\footnote` macro. However, if more than one reference to the same footnote is needed, authors may use `\footnotetext` and `\footnotemark`. This will produce notes (labeled by lower-case roman letters) inserted below the table rather than in the reference section or at the bottom of the page.

9. AUTHOR-DEFINED MACROS

Authors may define convenience macros to save keystrokes. This means that the macros may not invoke TeX macros such as `\if` or other context dependent commands. Also, LaTeX 2_ε provides three macros for declaring new commands: `\providecommand`, `\newcommand`, and `\renewcommand` (as well as their '`*`'-ed versions). These should be used. Authors may not use TeX's low-level commands `\def`, `\edef`, and `\gdef`.

10. SUMMARY

To ensure the best use of TeX manuscripts, authors need to follow the guidelines specified here. Use of low-level formatting commands to finely control horizontal and vertical spacing may be ignored during production, or even worse, make it impossible to convert the manuscript to our typesetting sofware. Authors should try to keep things as simple as possible and correctly use the proper REVTeX 4 or LaTeX 2_ε macros. Any questions about usage may be directed to `revtex@aps.org`.