APPENDIX A: CHARACTER SET LISTING

This appendix provides tables which show all of the special characters and mathematical symbols that are available within REVTEX. Some of these symbols require the AMSFonts to be available.

REVTEX version 3.1 supports an extensive set of symbols, alphabets, and special fonts. Their availability does not relieve an author (editor) of considering whether a chosen notation or symbol will convey the intended meaning, and whether there is a more conventional alternative. As always, for the benefit of the reader, notation should be clear, as simple as possible, and consistent with standard usage. Nonstandard symbols should only be used if necessary; their meaning should be explained in the paper at the first occurrence.

Editorial policy on this issue may vary from journal to journal. Check recent issues of a given journal and/or query the editor. APS authors may also consult the journal's "Information for Contributors" as well as the *Physical Review Style and Notation Guide*. In preparing an accepted paper for publication, the editor may suggest (require) the use of alternative notation.

1. LaTeX notations

a. Standard LaTeX symbols

The following tables show the standard symbols for LaTeX users.

TABLE I. Text accents with letter a.

à \`{a}	á \'{a}	â \^{a}	ä \"{a}
ã \~{a}	ā \={a}	ȧ \.{a}	ă \u{a}
ǎ \v{a}	a̋ \H{a}	a͡a \t{aa}	ą \c{a}
ạ \d{a}	a̲ \b{a}		

TABLE II. Math accents with letter a.

$\hat{a}$ \hat{a}	$\check{a}$ \check{a}	$\dot{a}$ \dot{a}	$\ddot{a}$ \ddot{a}
$\breve{a}$ \breve{a}	$\tilde{a}$ \tilde{a}	$\grave{a}$ \grave{a}	$\acute{a}$ \acute{a}
$\bar{a}$ \bar{a}	$\vec{a}$ \vec{a}		

TABLE III. Special symbols; any mode.

† \dagger	§ \S	© \copyright
‡ \ddagger	¶ \P	£ \pounds

TABLE IV. Other special (foreign) symbols; text mode.

å \aa	Å \AA	æ \ae	Æ \AE
ø \o	Ø \O	œ \oe	Œ \OE
ł \l	Ł \L	¿ ?‘	¡ !‘
ß \ss			

TABLE V. Greek letters; used in math mode.

Lowercase			
α \alpha	β \beta	γ \gamma	δ \delta
ϵ \epsilon	ε \varepsilon	ζ \zeta	η \eta
θ \theta	ϑ \vartheta	ι \iota	κ \kappa
λ \lambda	μ \mu	ν \nu	ξ \xi
o o	π \pi	ϖ \varpi	ρ \rho
ϱ \varrho	σ \sigma	ς \varsigma	τ \tau
υ \upsilon	ϕ \phi	φ \varphi	χ \chi
ψ \psi	ω \omega		
Uppercase			
Γ \Gamma	Δ \Delta	Θ \Theta	Λ \Lambda
Ξ \Xi	Π \Pi	Σ \Sigma	Υ \Upsilon
Φ \Phi	Ψ \Psi	Ω \Omega	

TABLE VI. Binary operation symbols; used in math mode.

$\pm$ \pm	$\mp$ \mp	$\times$ \times	$\div$ \div
$*$ \ast	$\star$ \star	$\circ$ \circ	$\bullet$ \bullet
$\cap$ \cap	$\cup$ \cup	$\uplus$ \uplus	$\cdot$ \cdot
$\sqcap$ \sqcap	$\sqcup$ \sqcup	$\vee$ \vee	$\wedge$ \wedge
$\oplus$ \oplus	$\ominus$ \ominus	$\otimes$ \otimes	$\oslash$ \oslash
$\bigtriangleup$ \bigtriangleup	$\odot$ \odot	$\lhd$ \lhd	$\dagger$ \dagger
$\bigtriangledown$ \bigtriangledown	$\bigcirc$ \bigcirc	$\rhd$ \rhd	$\ddagger$ \ddagger
$\triangleleft$ \triangleleft	$\diamond$ \diamond	$\unlhd$ \unlhd	$\setminus$ \setminus
$\triangleright$ \triangleright	$\wr$ \wr	$\unrhd$ \unrhd	$\amalg$ \amalg

TABLE VII. Relation symbols; used in math mode.

$\leq$ \leq	$\geq$ \geq	$\ll$ \ll	$\gg$ \gg
$\equiv$ \equiv	$\asymp$ \asymp	$\neq$ \neq	$\doteq$ \doteq
$\subset$ \subset	$\supset$ \supset	$\subseteq$ \subseteq	$\supseteq$ \supseteq
$\sqsubset$ \sqsubset	$\sqsupset$ \sqsupset	$\sqsubseteq$ \sqsubseteq	$\sqsupseteq$ \sqsupseteq
$\models$ \models	$\perp$ \perp	$\mid$ \mid	$\parallel$ \parallel
$\prec$ \prec	$\succ$ \succ	$\preceq$ \preceq	$\succeq$ \succeq
$\sim$ \sim	$\simeq$ \simeq	$\approx$ \approx	$\cong$ \cong
$\bowtie$ \bowtie	$\Join$ \Join	$\smile$ \smile	$\frown$ \frown
$\in$ \in	$\ni$ \ni	$\vdash$ \vdash	$\dashv$ \dashv
$\propto$ \propto			

© 1996 American Physical Society
Optical Society of America
American Institute of Physics

Negated relations can sometimes be constructed with `\not`. For example,

```
If $x \not< y$ then $x \not\leq z$.
```

gives

If $x \not< y$ then $x \not\leq z$.

The AMSFonts have many negated relations already constructed. See Appendix A 2.

TABLE VIII. Arrow symbols; used in math mode.

$\leftarrow$	`\leftarrow`	$\rightarrow$	`\rightarrow`
$\longleftarrow$	`\longleftarrow`	$\longrightarrow$	`\longrightarrow`
$\Leftarrow$	`\Leftarrow`	$\Rightarrow$	`\Rightarrow`
$\Longleftarrow$	`\Longleftarrow`	$\Longrightarrow$	`\Longrightarrow`
$\hookleftarrow$	`\hookleftarrow`	$\hookrightarrow$	`\hookrightarrow`
$\leftharpoonup$	`\leftharpoonup`	$\rightharpoonup$	`\rightharpoonup`
$\leftharpoondown$	`\leftharpoondown`	$\rightharpoondown$	`\rightharpoondown`
$\rightleftharpoons$	`\rightleftharpoons`	$\leadsto$	`\leadsto`
$\leftrightarrow$	`\leftrightarrow`	$\longleftrightarrow$	`\longleftrightarrow`
$\Leftrightarrow$	`\Leftrightarrow`	$\Longleftrightarrow$	`\Longleftrightarrow`
$\mapsto$	`\mapsto`	$\longmapsto$	`\longmapsto`
$\uparrow$	`\uparrow`		
$\downarrow$	`\downarrow`		
$\Uparrow$	`\Uparrow`		
$\Downarrow$	`\Downarrow`		
$\updownarrow$	`\updownarrow`		
$\Updownarrow$	`\Updownarrow`		
$\nearrow$	`\nearrow`		
$\searrow$	`\searrow`		
$\swarrow$	`\swarrow`		
$\nwarrow$	`\nwarrow`		

TABLE IX. Miscellaneous symbols; used in math mode.

$\flat$ `\flat`	$\natural$ `\natural`	$\sharp$ `\sharp`	$\prime$ `\prime`
$\backslash$ `\backslash`	$\forall$ `\forall`	∞ `\infty`	$\exists$ `\exists`
$\emptyset$ `\emptyset`	$\Box$ `\Box`	∇ `\nabla`	$\neg$ `\neg`
$\diamond$ `\Diamond`	$\surd$ `\surd`	$\triangle$ `\triangle`	$\|$ `|`
$\clubsuit$ `\clubsuit`	$\aleph$ `\aleph`	$\wp$ `\wp`	$\top$ `\top`
$\diamondsuit$ `\diamondsuit`	$\Re$ `\Re`	ℓ `\ell`	$\bot$ `\bot`
$\heartsuit$ `\heartsuit`	$\Im$ `\Im`	$\imath$ `\imath`	∂ `\partial`
$\spadesuit$ `\spadesuit`	$\hbar$ `\hbar`	$\jmath$ `\jmath`	$\angle$ `\angle`
$\mho$ `\mho`			

TABLE X. Log-like functions; used in math mode.

`\arccos`	`\arcsin`	`\arctan`	`\arg`	`\cos`
`\cosh`	`\cot`	`\coth`	`\csc`	`\deg`
`\det`	`\dim`	`\exp`	`\gcd`	`\hom`
`\inf`	`\ker`	`\lg`	`\lim`	`\liminf`
`\limsup`	`\ln`	`\log`	`\max`	`\min`
`\Pr`	`\sec`	`\sin`	`\sinh`	`\sup`
`\tan`	`\tanh`			

TABLE XI. Delimiters; used in math mode.

((	))	/ /
[[	]]	\ `\backslash`
{ `\{`	} `\}`	| |
$\langle$ `\langle`	$\rangle$ `\rangle`	$\|$ `\\|`
$\uparrow$ `\uparrow`	$\Uparrow$ `\Uparrow`	$\lfloor$ `\lfloor`
$\downarrow$ `\downarrow`	$\Downarrow$ `\Downarrow`	$\rfloor$ `\rfloor`
$\updownarrow$ `\updownarrow`	$\Updownarrow$ `\Updownarrow`	$\lceil$ `\lceil`
		$\rceil$ `\rceil`

TABLE XII. Miscellaneous symbols; used in math mode.

$\sum$	`\sum`	$\prod$	`\prod`	$\coprod$	`\coprod`
$\int$	`\int`	$\oint$	`\oint`	$\biguplus$	`\biguplus`
$\bigcap$	`\bigcap`	$\bigcup$	`\bigcup`	$\bigsqcup$	`\bigsqcup`
$\bigodot$	`\bigodot`	$\bigotimes$	`\bigotimes`	$\bigoplus$	`\bigoplus`
$\bigvee$	`\bigvee`	$\bigwedge$	`\bigwedge`		

b. Standard LaTeX typefaces

You can access a pair of special typefaces in LaTeX.

You can switch to script (calligraphic) letters by using the `\cal` command (note the $\mathcal{L}$):

```
{\cal L}_{\text{int}} = e F^{3}_{\pi} r^{2}
  B^{0}(r,t) \epsilon \sin(\Omega t)
  \exp(\eta t),
```

gives

$$\mathcal{L}_{\text{int}} = eF_{\pi}^{3} r^{2} B^{0}(r,t) \epsilon \sin(\Omega t) \exp(\eta t),$$

Only uppercase letters are available in the `\cal` font.

You can switch to sans serif letters by using the \sf command (note the M):

```
R({\cal Q}-{\cal Q}_{0})
=R_{0} \exp\left(-\case1/2\Delta {\cal Q}
 \cdot{\sf M}\cdot\Delta{\cal Q}\right).
  \label{eq:rdef}
```

gives

$$R(\mathcal{Q}-\mathcal{Q}_0) = R_0 \exp\left(-\tfrac{1}{2}\Delta\mathcal{Q}\cdot\mathsf{M}\cdot\Delta\mathcal{Q}\right).$$

Both uppercase and lowercase letters are available with \sf.

c. *Other notations*

The \overline command puts a horizontal line above its argument in math mode:

```
$\overline{x}+\overline{y}$
```

gives

$$\overline{x}+\overline{y}$$

There is an analogous \underline command that works in text or math mode:

```
The equation \underline{is} $\underline{x+y}$.
```

gives

The equation $\underline{\text{is}}$ $\underline{x+y}$.

Horizontal braces are put above or below an expression with the \overbrace and \underbrace commands:

```
$\underbrace{a_{1} + \overbrace{a_{2}+a_{3}}
  + a_{4}}$
```

gives

$$\underbrace{a_1+\overbrace{a_2+a_3}+a_4}$$

and in displayed math, a subscript or a superscript puts a label on the brace:

```
$\underbrace{a_{1} +
  \overbrace{a_{2}+\cdots+a_{n-1}}^{n-2}
   + a_{n}}_{n}$
```

gives

$$\underbrace{a_1+\overbrace{a_2+\cdots+a_{n-1}}^{n-2}+a_n}_{n}$$

Wide versions of the \hat and \tilde commands are available. They are called \widehat and \widetilde, respectively. Here is an example:

```
$\widehat{a} + \widehat{ab}
 + \widehat{abc} + \widehat{abcd}$
```

gives

$$\widehat{a}+\widehat{ab}+\widehat{abc}+\widehat{abcd}$$

2. AMSFonts notations

The AMSFonts are fonts that were developed by the American Mathematical Society and are now made available free of charge by the AMS. The METAFONT source files for these fonts are freely available, as are precompiled .pk files. There are two style options that can be used to access the AMSFonts: amsfonts and amssymb. These style options are explained in The appropriate society-specific documentation. Not distributed with REVTEX are the files amsfonts.sty and amssymb.sty of the $\mathcal{AMS}$-LaTeX distribution. These files are called in by REVTEX, when the NFSS is in effect, to give you access to the AMSFonts; under the OFSS REVTEX itself will do the work necessary to allow access.

a. *Using the* amsfonts *option*

The amsfonts style option will give you access to the \frak and \Bbb fonts and will also use the extra Computer Modern fonts from the AMS in order to provide better access to bold math characters at smaller sizes and in super- and subscripts.

AMSFonts typefaces. With the AMSFonts installed and in use through either the amsfonts or amssymb style option, the \frak and \Bbb commands are available. \frak switches to the AMS Fraktur font, while \Bbb switches to the so-called "Blackboard Bold" font. Only uppercase letters are available in Blackboard Bold, and there is no bold version of the font. Fraktur has both uppercase and lowercase letters and will become bold in a bbox.

Here are the letters "ABCDE" from \frak: $\mathfrak{ABCDE}$. And here are the letters "RIZN" from \Bbb: $\mathbb{RIZN}$.

Here is some math with superscripts and \frak. It demonstrates the output of \bbox{#1}.

Normal: $\mathfrak{E} = mc^{2\pi}$, bbox: $\boldsymbol{\mathfrak{E} = mc^{2\pi}}$

b. *Using the* amssymb *option*

The amssymb style option gives all the font capabilities of the amsfonts option. It also defines names for many extra symbols that are present in the AMSFonts. The names are the same as those the AMS uses. These symbols and their names are shown below, if you have the AMSFonts installed and the amssymb option selected.

Please be aware that no bold versions are available for any of the characters in this subsection.

TABLE XIII. Extra lowercase Greek letters available with amssymb option selected.

$\digamma$ \digamma	$\varkappa$ \varkappa

TABLE XIV. Extra Hebrew letters available with amssymb option selected.

ℶ \beth	ℷ \gimel
ℸ \daleth	

TABLE XV. Binary relations available with amssymb option selected.

≦ \leqq	≧ \geqq
⩽ \leqslant	⩾ \geqslant
⪕ \eqslantless	⪖ \eqslantgtr
≲ \lesssim	≳ \gtrsim
⪅ \lessapprox	⪆ \gtrapprox
≒ \approxeq	
⋖ \lessdot	⋗ \gtrdot
⋘ \lll,\llless	⋙ \ggg,\gggtr
≶ \lessgtr	≷ \gtrless
⋚ \lesseqgtr	⋛ \gtreqless
⪋ \lesseqqgtr	⪌ \gtreqqless
⪷ \preccurlyeq	⪸ \succcurlyeq
⋞ \curlyeqprec	⋟ \curlyeqsucc
≾ \precsim	≿ \succsim
⪷ \precapprox	⪸ \succapprox
⫅ \subseteqq	⫆ \supseteqq
⋐ \Subset	⋑ \Supset
⊏ \sqsubset	⊐ \sqsupset
∽ \backsim	∼ \thicksim
⋍ \backsimeq	≈ \thickapprox
≑ \doteqdot,\Doteq	≖ \eqcirc
≓ \risingdotseq	≗ \circeq
≒ \fallingdotseq	≜ \triangleq
◁ \vartriangleleft	▷ \vartriangleright
⊴ \trianglelefteq	⊵ \trianglerighteq
⊨ \vDash	⊩ \Vdash
⊪ \Vvdash	
⌣ \smallsmile	⌢ \smallfrown
∣ \shortmid	∥ \shortparallel
≏ \bumpeq	≎ \Bumpeq
≬ \between	⋔ \pitchfork

TABLE XVI. Miscellaneous symbols available with amssymb option selected.

ℏ \hbar	ℏ \hslash
‵ \backprime	∅ \varnothing
△ \vartriangle	▲ \blacktriangle
▽ \triangledown	▼ \blacktriangledown
□ \square	■ \blacksquare
◊ \lozenge	⧫ \blacklozenge
Ⓢ \circledS	★ \bigstar
∠ \angle	∢ \sphericalangle
∡ \measuredangle	
∄ \nexists	∁ \complement
℧ \mho	ð \eth
ⅎ \Finv	⅁ \Game
╱ \diagup	╲ \diagdown
𝕜 \Bbbk	

TABLE XVII. Binary operators available with amssymb option selected.

∔ \dotplus	⋉ \ltimes
∖ \smallsetminus	⋊ \rtimes
⊼ \barwedge	⋏ \curlywedge
⊻ \veebar	⋎ \curlyvee
⩘ \doublebarwedge	
⋒ \Cap,\doublecap	⋋ \leftthreetimes
⋓ \Cup,\doublecup	⋌ \rightthreetimes
⊠ \boxtimes	⊛ \circledast
⊟ \boxminus	⊝ \circleddash
⊞ \boxplus	⋅ \centerdot
⊡ \boxdot	⊚ \circledcirc
⋇ \divideontimes	⊺ \intercal

TABLE XVIII. Other miscellaneous symbols available with amssymb option selected.

∝ \varpropto	϶ \backepsilon
◀ \blacktriangleleft	▶ \blacktriangleright
∴ \therefore	∵ \because

TABLE XIX. Negated relations available with amssymb option selected.

$\nsim$	\nsim	$\ncong$	\ncong
$\nless$	\nless	$\ngtr$	\ngtr
$\nleq$	\nleq	$\ngeq$	\ngeq
$\nleqslant$	\nleqslant	$\ngeqslant$	\ngeqslant
$\nleqq$	\nleqq	$\ngeqq$	\ngeqq
$\lneq$	\lneq	$\gneq$	\gneq
$\lneqq$	\lneqq	$\gneqq$	\gneqq
$\lvertneqq$	\lvertneqq	$\gvertneqq$	\gvertneqq
$\lnsim$	\lnsim	$\gnsim$	\gnsim
$\lnapprox$	\lnapprox	$\gnapprox$	\gnapprox
$\nprec$	\nprec	$\nsucc$	\nsucc
$\npreceq$	\npreceq	$\nsucceq$	\nsucceq
$\precneqq$	\precneqq	$\succneqq$	\succneqq
$\precnsim$	\precnsim	$\succnsim$	\succnsim
$\precnapprox$	\precnapprox	$\succnapprox$	\succnapprox
$\ntriangleleft$	\ntriangleleft	$\ntriangleright$	\ntriangleright
$\ntrianglelefteq$	\ntrianglelefteq	$\ntrianglerighteq$	\ntrianglerighteq
$\nshortmid$	\nshortmid	$\nmid$	\nmid
$\nshortparallel$	\nshortparallel	$\nparallel$	\nparallel
$\nvdash$	\nvdash	$\nvDash$	\nvDash
$\nVdash$	\nVdash	$\nVDash$	\nVDash
$\nsubseteq$	\nsubseteq	$\nsupseteq$	\nsupseteq
$\nsubseteqq$	\nsubseteqq	$\nsupseteqq$	\nsupseteqq
$\varsubsetneq$	\varsubsetneq	$\varsupsetneq$	\varsupsetneq
$\subsetneq$	\subsetneq	$\supsetneq$	\supsetneq
$\varsubsetneqq$	\varsubsetneqq	$\varsupsetneqq$	\varsupsetneqq
$\subsetneqq$	\subsetneqq	$\supsetneqq$	\supsetneqq

TABLE XX. Yet more miscellaneous symbols available with amssymb option selected.

$\dashrightarrow$	\dashrightarrow	$\dashleftarrow$	\dashleftarrow
$\dashrightarrow$	\dasharrow		
$\ulcorner$	\ulcorner	$\urcorner$	\urcorner
$\llcorner$	\llcorner	$\lrcorner$	\lrcorner
¥	\yen	✓	\checkmark
Ⓡ	\circledR	✠	\maltese

TABLE XXI. Extra negated arrows available with amssymb option selected.

$\nleftrightarrow$	\nleftrightarrow	$\nLeftrightarrow$	\nLeftrightarrow
$\nleftarrow$	\nleftarrow	$\nrightarrow$	\nrightarrow
$\nLeftarrow$	\nLeftarrow	$\nRightarrow$	\nRightarrow

TABLE XXII. Extra arrows available with amssymb option selected.

$\leftrightarrows$	\leftrightarrows	$\rightleftarrows$	\rightleftarrows
$\leftleftarrows$	\leftleftarrows	$\rightrightarrows$	\rightrightarrows
$\leftrightharpoons$	\leftrightharpoons	$\rightleftharpoons$	\rightleftharpoons
$\Lleftarrow$	\Lleftarrow	$\Rrightarrow$	\Rrightarrow
$\twoheadleftarrow$	\twoheadleftarrow	$\twoheadrightarrow$	\twoheadrightarrow
$\leftarrowtail$	\leftarrowtail	$\rightarrowtail$	\rightarrowtail
$\looparrowleft$	\looparrowleft	$\looparrowright$	\looparrowright
$\Lsh$	\Lsh	$\Rsh$	\Rsh
$\upuparrows$	\upuparrows	$\downdownarrows$	\downdownarrows
$\upharpoonleft$	\upharpoonleft	$\upharpoonright$	\upharpoonright, \restriction
$\downharpoonleft$	\downharpoonleft	$\downharpoonright$	\downharpoonright
$\curvearrowleft$	\curvearrowleft	$\curvearrowright$	\curvearrowright
$\circlearrowleft$	\circlearrowleft	$\circlearrowright$	\circlearrowright
$\multimap$	\multimap	$\rightsquigarrow$	\rightsquigarrow
$\leftrightsquigarrow$	\leftrightsquigarrow		

3. REVTEX notations

An openface one is available. It does not change size in superscripts. Here is an example: `$\openone$` gives $\mathbb{1}$. `\openone` is a fragile command and must be immediately preceded by `\protect` when used in section headings and captions.

Bold large bracketing is also available. The normal commands `\Biggl`,`\Bigl`,..., when used with an extra "b" on the end of the command, come out bold:

```
\[
\Biggl(\biggl(\Bigl(\bigl(
(x)
\bigr)\Bigr)\biggr)\Biggr)
\]
```

gives

$$\Biggl(\biggl(\Bigl(\bigl((x)\bigr)\Bigr)\biggr)\Biggr)$$

while

```
\[
\Bigglb(\bigglb(\Biglb(\biglb(
(x)
\bigrb)\Bigrb)\biggrb)\Biggrb)
\]
```

gives

$$\Bigglb(\bigglb(\Biglb(\biglb((x)\bigrb)\Bigrb)\biggrb)\Biggrb)$$

The commands `\lesssim`,`\gtrsim` give the output $\lesssim$, $\gtrsim$, even without the `amssymb` style option. (The commands `\alt`,`\agt`, respectively, may also be used.) These commands will be fragile if you are not using the `amssymb` option.

Some extra diacritics have been provided. They scale correctly in superscripts. Some examples follow. `$\tensor{x}$` gives $\overset{\leftrightarrow}{x}$. `$\overstar{x}$` gives $\overset{*}{x}$. `$\overdots{x}$` gives $\ddot{x}$. `$\overcirc{x}$` gives $\mathring{x}$. `$\loarrow{x}$` gives $\overset{\leftarrow}{x}$. `$\roarrow{x}$` gives $\vec{x}$. These commands all work correctly in superscripts.

`\slantfrac{#1}{#2}` produces a slanted fraction in math mode: $\slantfrac{1}{2}$. This command should not be used in files destined to be submitted to the APS (normal upright fractions will be produced).

`\corresponds` produces the symbol $\triangleq$ math mode, `\precsim` produces $\precsim$ in math mode, and `\succsim` produces $\succsim$ in math mode. The AMSFonts will be used for these symbols if you have them, but are not necessary.

`\lambdabar` produces "lambda-bar" in math mode: $\lambda\!\!\!^{-}$.

APPENDIX B: COMMAND LIST

In the following pages are brief descriptions of some necessary commands. Those commands that are unique to REVTEX are so noted with (R). Please consult the *LATEX User's Guide & Reference Manual* if you have further questions regarding LATEX commands.

If commands require arguments, they are so noted with `#1`, `#2`, etc. The commands are in order of their probable occurrence in a file.

`\documentstyle[#1]{revtex}`	Will allow for proper formatting of paper. Selecting a society style option (either `osa`, `aps` or `seg`) is mandatory. Use `[manuscript,osa]` for `#1` if manuscript style is desired for the OSA macros, and use `[osa]` for `#1` if galley style is desired for the OSA macros. Use `[preprint,aps]` for `#1` if preprint style is desired for the APS macros, and use `[aps]` for `#1` if galley style is desired for the APS macros. The preprint and manuscript styles are similar ideas. The author will also need to add a journal option. Consult the society-specific documentation for the relevant options. To number equations by section, use the `eqsecnum` option.
`\tighten`	Preprint style outputs a double-spaced manuscript. When used in preprint style, this command reverts to single spacing to save paper. Has no effect in galley style. Use before `\begin{document}`. You can also use the `tighten` style option to get single-spaced preprint output for the whole paper. (R)
`\begin{document}`	Begins the body of the REVTEX document.
`\preprint{#1}`	When used as the first command of a document, places `#1` at the top right corner of the first page in preprint style. Used for site-specific preprint numbers. (R)
`\draft`	Omission of this command will cause printing of PACS numbers to be stifled. (R)
`\title{#1}`	`#1` is the title of the paper. The title should be broken with the `\\` command.
`\author{#1}`	`#1` represents a list of authors. Use `\\` to force linebreaks.
`\address{#1}`	`#1` represents an author's address (institution). The address should be broken with `\\` if necessary. (R)
`\date{#1}`	`#1` represents the date of receipt at the Editorial Offices. This date will be inserted at the production site.
`\maketitle`	Prints the material contained in the `\title{#1}`, `\author{#1}`, `\address{#1}` and `\date{#1}` commands.
`\begin{abstract}`, `\end{abstract}`,	Signals the beginning or end of the abstract.
`\pacs{#1}`	`#1` represents valid PACS numbers. This command should be used after the abstract, even if `#1` is empty. Use the `\draft` command to have `#1` printed. (R)
`\narrowtext`	For galley style, will set all text that follows into a 3.4-in. column. Does not affect preprint output. (R)
`\mediumtext`	For galley style, will set figure captions and tables 5.5-in. wide. Does not affect preprint output. (R)
`\widetext`	For galley style, will set all text that follows into a 7-in.-wide column. Does not affect preprint output. (R)
`\section{#1}`	`#1` represents a primary heading. Fragile commands should be preceded by `\protect`.
`\subsection{#1}`	`#1` represents a secondary heading. Fragile commands should be preceded by `\protect`.
`\subsubsection{#1}`	`#1` represents a third-level heading. Fragile commands should be preceded by `\protect`.

© 1996 American Physical Society
Optical Society of America
American Institute of Physics

`\paragraph{#1}`	`#1` represents a fourth-level heading. Fragile commands should be preceded by `\protect`.
`\cite{#1}`	Sets a reference or byline footnote citation. `#1` represents a list of reference tags used with `\bibitem{#1}`. Lists of consecutive numbers will be collapsed; e.g., [1,2,3] will become [1–3]. The style of citation in output will depend on the society and/or journal option selected. Fragile.
`\onlinecite{#1}`	Sets a reference citation just like `\cite{#1}` does, except that it places the citation on-line in styles where the citations are usually superscripts. Fragile. (R)
`\case{#1}{#2}`	Sets textstyle (smaller) fractions in displayed equations. `#1` is the numerator, `#2` is denominator. An optional `/` may be added between `{#1}` and `{#2}`. (R)
`\openone`	Produces an openface one ($\mathbb{1}$). Fragile. (R)
`\precsim,\succsim`	Produce the signs $\precsim, \succsim$, respectively, in math mode.
`\lesssim,\gtrsim`	Produce "approximately less than" and "approximately greater than" signs ($\lesssim, \gtrsim$), respectively, in math mode. Fragile.
`\tensor{#1}`	Gives double-headed overarrow in math mode: `$\tensor{x}$` gives $\overleftrightarrow{x}$. (R)
`\loarrow{#1}`	Gives left-going overarrow in math mode: `$\loarrow{x}$` gives $\overleftarrow{x}$. (R)
`\roarrow{#1}`	Gives right-going overarrow in math mode to match `\loarrow{#1}`: `$\roarrow{x}$` gives $\overrightarrow{x}$. (R)
`\overstar{#1}`	Gives overstar in math mode: `$\overstar{x}$` gives $\overset{*}{x}$. (R)
`\overcirc{#1}`	Gives overcircle in math mode: `$\overcirc{x}$` gives $\overset{\circ}{x}$. (R)
`\biglb(`, etc.	Commands to produce large bold bracketing. (R)
`\corresponds`	Produces "corresponds" sign in math mode: $\triangleq$.
`\slantfrac{#1}{#2}`	Produces a slanted fraction in math mode: $1/2$. Should not be used for APS files. (R)
`\lambdabar`	Produces "lambda-bar" in math mode: $\lambda\!\!\!^{-}$. (R)
`\FL`	Sets the displayed equation that follows flush left with the margin. Only works in galley style. (R)
`\FR`	Sets the displayed equation that follows flush right. Only works in galley style. (R)
`\[,\]`	Signals beginning or end of unnumbered displayed equation.
`\begin{equation},\end{equation}`	Signals beginning or end of single-line displayed equation.
`\begin{eqnarray},\end{eqnarray}`	Signals beginning or end of multiline displayed equation.
`\nonumber`	Suppresses the numbering of a single line in a eqnarray environment.
`\eqnum{#1}`	Uses `#1` as the number for an equation or for a single line of an eqnarray. The number can be cross-referenced with `\ref{#1}` if `\label{#1}` is used right after `\eqnum{#1}`. Numbers set with `\eqnum{#1}` are completely independent of the automatic numbering. (R)
`\begin{quasitable},\end{quasitable}`	Environment to produce tables in text. See apssamp.tex for an example. (R)
`\label{#1}`	`#1` represents the tag. This command appears in displayed equations that need cross-referencing, all tables, and all figure captions. Also used following section headings that need cross-referencing.
`\ref{#1}`	`#1` represents the tag. This command appears in text wherever sections, equations, tables, or figures are cited. Fragile.
`\acknowledgments`	Sets a section heading for the acknowledgment section.

`\appendix`	After using this command, all `\section{#1}` commands will set `#1` as an appendix heading. `\section*{#1}` will set `#1` as an appendix heading without a letter (A, B, etc.) and should be used when there is only one appendix.
`\begin{references},\end{references}`	Signals beginning or end of reference section. The normal LATEX `thebibliography` environment can also be used. (R)
`\bibitem[#1]{#2}`	Sets a reference in the reference section. `#1` represents an optional, author-specified reference symbol. This is used for byline endnotes that are not numbered (e.g., those in *Physical Review*). `#2` represents the reference tag.
`\begin{figure}`	Begins the environment for the figure caption.
`\caption{#1}`	`#1` represents the text of the caption. Fragile commands must be preceded by `\protect`.
`\label{#2}`	`#2` represents the figure caption tag.
`\end{figure}`	Ends the environment for the figure caption.
`\begin{table}`	Signals the beginning of a table.
`\squeezetable`	Used immediately after `\begin{table}`, shrinks tables that would not otherwise fit. (R)
`\caption{#1}`	Sets the table caption. `#1` represents the text of the caption. Fragile commands must be preceded by `\protect`.
`\begin{tabular}{#1}`	Signals the beginning of the tabular material. `#1` represents formatting commands for the columns.
`\hline`	Sets a horizontal rule, separating column headings from data. `\tableline` may also be used.
`\end{tabular}`	Signals end of tabular material.
`\end{table}`	Signals the end of a table.
`\end{document}`	Ends the body of the REVTEX document.