Four varieties of dashes are used in technical writing

\[
\begin{align*}
\text{em dash} & \quad — \\
\text{en dash} & \quad – \\
\text{minus sign} & \quad – \\
\text{hyphen} & \quad -
\end{align*}
\]

- Used to punctuate sentences
- Used to indicate a range of numbers
- Used to denote a mathematical quantity or operation
- Used to break or join words
Em dashes are used for punctuation

Around appositives, when the use of commas would cause confusion
“However, during certain events—for example, when a mineral crystallizes from a melt and cools—the daughter products of radioactive decay can no longer equilibrate, preserving the state of the system.” Science 297, 1658 (2002).

In place of commas for emphasis
“The EFT effective potential has a huge number of metastable dS minima—more than $e^{160}$ of them.”

Em dashes can also be used instead of colons and parentheses

Instead of a colon to introduce a series
“These are followed by discussions of fundamental photonic devices and techniques—beam splitters, homodyne detection, interferometers, and photon-count statistics.” Physics Today 55, 54 (2002).

Instead of parentheses to emphasize parenthetical information
“These and similar measures—the ERC made some 20 recommendations—are intended to keep CERN tightly focused on successfully completing the LHC.”
Replace semicolons with dashes to strengthen the connection between two independent clauses

with a semicolon:

“The density of states is low; MgB$_2$ has no $d$ electrons.” Physics Today 56, 38 (2003).

with an em dash:

“The density of states is low—MgB$_2$ has no $d$ electrons.”

Replace a comma with an em dash to focus the reader’s attention

with a comma:

“Combining the fabrication capabilities of the STM with various modes of spectroscopic measurements will provide a unique means of exploring quantum coherence and entanglement issues, one spin at a time.”

with an em dash:

“Combining the fabrication capabilities of the STM with various modes of spectroscopic measurements will provide a unique means of exploring quantum coherence and entanglement issues—one spin at a time.”
Horrible example:

Because contributions to the muon anomaly from known processes—QED, the weak interaction, and hadronic vacuum polarization (HVP), including higher-order terms, are believed to be understood at the sub-ppm level, any significant difference between experiment and theory suggests a yet unknown, and thus not included, physical process.

49 words! 8 commas!!

Super em dash to the rescue—

Because contributions to the muon anomaly from known processes—QED, the weak interaction, and hadronic vacuum polarization (HVP), including higher-order terms—are believed to be understood at the sub-ppm level, any significant difference between experiment and theory suggests a yet unknown (and thus not included) physical process.
Creating an em dash (—)

Word®:
- Insert “Symbol”—available in both
  “normal text” and “symbol” fonts
- Shortcut: Crtl + Alt + numeric keypad -
- Set “Autocorrect” to automatically substitute
  an em dash when you type two hyphens

HTML: &amp;#151;

TeX: --- (three hyphens)
- If you really want three hyphens, type {|-}|-|-

En dashes are almost always used
to indicate a range of numbers

Examples:
- References 6–11, 143–167 pages, 480–530 nm

Caution!! The interpretation of the en
dash in a range can be ambiguous—
does it mean “to” or “through”?

Dates extending over parts of two
successive calendar years are indicated
by a solidus (/) instead of an en dash
- Winter 2005/06, Academic Year 2005/06

N.B. writing 2005–2006 would indicate two entire years
An en dash may be used to join some compound modifiers
In a compound adjective formed from proper names
   Fermi–Dirac–Sommerfeld law
   Bose–Einstein condensate

In a compound adjective, when one or both elements consist of multiple words or a hyphenated word
   Einstein–de Haas effect
   superconductor–normal metal interface
   high-density–low-cholesterol lipoprotein

Creating an en dash (–)

Word®:
   Insert “Symbol”—available in both “normal text” and “symbol” fonts
   Keyboard shortcut: Crtl + numeric keypad -

HTML: &#150;

TeX: -- (two hyphens)
**Do not use spaces with dashes**

Em dashes and en dashes are neither preceded nor followed by spaces.

“If a photon in state $|\psi\rangle$ passes through a polarizing beamsplitter—a device that reflects (transmits) horizontally (vertically) polarized photons—it will be found in the reflected (transmitted) beam with probability $|\alpha|^2(|\beta|^2)$.” Nature 390, 576 (1997).

“$P (\chi^2 < \chi^2_{\text{min}})$ is 95.2%, 96.5%, 94.8% for the multipole ranges 401–1000, 401–750, 726–1025, respectively.” astro-ph/0105296v1 (2001).

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**Do not use hyphens for “minus signs” in numerical expressions**

In negative numbers

$-25^\circ\text{C}$

$1.7 \times 10^{-6}$

In mathematical operations

$a - b = c$

Use a thin space before and after a minus sign if it represents a mathematical operation.
Creating a minus sign (–)

Word®:
Insert “Symbol”—available in both “normal text” and “symbol” fonts
Keyboard shortcut: Ctrl + numeric keypad -

HTML: &#150;
TeX: $-$ (math mode)

Hyphens have only two uses in technical writing

To break words at the end of a line
“Nanowires have attracted extensive interest in recent years because of their unusual quantum properties.” Science 294, 348 (2001).

To join words in compound nouns or compound adjectives
co-worker, self-energy
“Now Drew Geller and Swift have built off-the-shelf speaker–pipe modules that, when hooked together, use a traveling acoustic wave to achieve arbitrary degrees of purity in the separation process.”
Use a hyphen to create compound modifiers

Nouns, adjectives, adverbs, and numbers are joined with hyphens to make an adjective modifying a noun

- noun-noun: galaxy-galaxy collisions
- adjective-noun: high-energy physics
- adverb-adj-noun: very-large-scale integration (VLSI)
- number-noun: 20-nm layer

Adverbs ending in “ly” are not attached by hyphens in compound modifiers

- highly charged particles
- longitudinally polarized hydrogen target

Stick hyphens in compound modifiers carefully

Some compound modifiers are never hyphenated*

- condensed matter physics
- Monte Carlo calculations
- finite element analysis
- heterojunction bipolar transistor
- molar absorption coefficient

Judgment is required

- self-assembled carbon nanotubes or self-assembled-carbon nanotubes
- polarized hydrogen target or polarized-hydrogen target

*but should be
Some more from the AIP—
“The tendency in scientific spelling is to avoid the hyphen when it does not serve a useful purpose.”

“Useful purposes”:
If closing up would produce double letters, e.g., non-negative, electro-optical; but unnecessary, coordinate, deexcitation
If a prefix or suffix is added to a proper noun, symbol, or numeral, e.g., non-Fermi, Bose-like, di-MeB, pseudo-P, 13-fold

“self-”, “free-”, and “half-” words are usually hyphenated

“Self” words are almost always hyphenated
self-consistent, self-inductance but selfsame

“Half” words are usually hyphenated
half-life, half-width, half-baked but halftone and halfway and half step

“Free” words are often hyphenated
divergence-free, but free fall and freestanding
Hyphenating “well” words is tricky

“Well” words are hyphenated when they are used as adjectives preceding a noun
the well-known Coriolis effect
the well-studied sign problem in quantum Monte Carlo

“Well” words are not hyphenated when they modify a “to be” verb
(now the “well” is modifying the verb)
The BCS theory has been well accepted by the community.

Right or wrong?

David Hertzog is a well regarded nuclear physicist.
Alan Nathan is well-regarded.

Words with prefixes and suffixes are usually not hyphenated

Units of measure that incorporate “powers” prefixes when the units are written as words, e.g., femtosecond, milligram, gigavolt, terahertz
but kilohm and kilo-oersted

Other examples: birefringence, diagonalizable, multivalent, photoinduced, nonionized, preionized, (but un-ionized)

If the prefix or suffix is added to more than one root word, hyphenate them all, e.g., non-time-dependent, free-electron-like
Don’t hyphenate your “anties”

Antiparticles are not hyphenated
antiproton, antineutron
“antimatter” is not hyphenated
“antilog” and “antilogrithm” and
“antilogrithmic” are not hyphenated
“anharmonic” and “anisotropic”
are not hyphenated
(use “an” instead of “anti” before
words beginning with “h” or “i”)

“band” words are not hyphenated; they’re written either closed or open†
band edge  band shape
band gap  band shift
bandhead  band spectrum
bandlimited  band structure
bandpass  bandwidth
(but d-band width)

†apparently based solely on the irrational whim of AIP copy editors; just memorize ’em—cme

AIP Style Manual,
4th ed., Appendix B
Compounds evolve in English—your mileage may differ

Evolution is open → hyphenated → closed
   data base → data-base → database
   broad band → broad-band → broadband

If you’re not sure where your word is in its evolutionary journey, consult a scientific dictionary or the AIP Style Guide (Appx. B)

If you’re sure, look it up anyway—
you will learn humility
cross-check, cross field, crosshatched, crossover, cross section, cross term…

Learn the notation that copy editors use to correct text

Insert em dash
   mark a caret (^) in the text where the dash is to be inserted in the margin, write $\frac{1}{M}$

Insert en dash
   mark a caret (^) in the text where the dash is to be inserted in the margin, write $\frac{1}{N}$

Insert hyphen
   mark a caret (^) in the text where the hyphen is to be inserted and draw a hyphen above the line of text
More than you ever wanted to know about hyphenation …

http://www.hyphenologist.co.uk/book/BOOK-ED3.HTM*

*Note that this reference is British; American usage may [probably will] differ.

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