Hyphens, Dashes, and Minus Signs

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"October Lovers Club fires up annual autumnal celebration"

The Daily Illini, 2 Oct 2014

Hyphens are important!

Four varieties of horizontal lines are used as punctuation in technical writing

em dash —

Used to punctuate sentences

en dash –

Used to indicate a range of numbers

minus sign –

Used to denote a mathematical quantity or operation

hyphen -

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^{100} of them."
Physics Today **57** (4), 50 (2004).

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." Physics Today **55**, 27 (2002).

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, such as 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: —

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

superconductor–normal metal interface
high-density–low-cholesterol lipoprotein

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Creating an en dash (–)

Word®:

- Insert "Symbol"—available in both "normal text" and "symbol" fonts
- Keyboard shortcut: Crtl + numeric keypad -

HTML: –

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

1 – 6

Do not use hyphens for minus signs in numerical expressions

In negative numbers

$-25^{\circ}C$

1.7×10^{-6} atoms

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: Crtl + numeric keypad -**

HTML: –

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 quan-tum 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."
Physics Today **57**(4), 9 (2004).

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**

***but should be**

Judgment is required

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

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

Tip: Invest in a good dictionary and use it —*nobody* can remember all the exceptions.

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 an adverb modifying the verb)
- The BCS theory has been well accepted by the community.

Right or wrong?

- Celia Elliott is a well regarded technical editor.
- Brian DeMarco is well-known in the AMO community.

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†

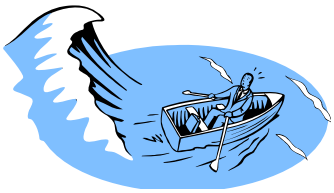
band edge
band gap
bandhead
bandlimited
bandpass
band shape
band shift
band spectrum
band structure
bandwidth
(but *d*-band width)

AIP Style Manual,
4th ed., Appendix B

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

"wave" words are not hyphenated; they're written either closed or open†

wave field
wave form
wave front
wave function
waveguide
waveheight
wavelength
wave number
wave packet
wave vector



AIP Style Manual,
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Finally, "cross" words appear to be completely random

cross-check
cross field
crosshatched
crossover
cross term
cross section
cross-section

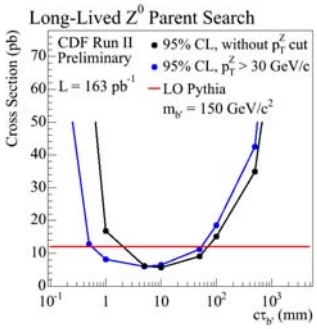

Fig. 1. Cross section limit as a function of lifetime, for a b' mass of 150 GeV, compared with the theoretical cross section.

Absorber materials are used for radar cross-section reduction.

Compounds *evolve* in English—

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

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

To recap:

Use em dashes as emphatic punctuation

Use en (*n*) dashes for number ranges

Take the time to insert a minus sign—don't be sloppy and make do with a hyphen

Hyphens are used *only* to break words at the end of a line or to make adjectives

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