



# A scientific style guide

Edward Laird  
Lancaster University

## Why I wrote this guide

Newspapers publish style guides to help their journalists write clearly and consistently and avoid common errors. Scientists need them too. Every year I correct the same errors in MPhys reports, theses, and draft papers. This style guide collates the most common mistakes.

The best way to use this guide is to ignore it and write your first draft as fast as possible. Once you have the draft written, go back and edit it following these rules. Please do this before you send anything to me for feedback. You will save us both time and help me give you better advice.

This guide is based on the [Physical Review Style and Notation Guide](#), which is close to the house style of other major journals.

## Avoiding common mistakes

### Units

- Units are always in roman font (not italic).  
The area was  $\sigma = 2.3 \times 10^6 \text{ m}^2$ .      not      The area was  $\sigma = 2.3 \times 10^6 m^2$ .
- It is essential to get the capitalisation right.  
The frequency was 13 kHz at a temperature of 77 K.      not      The frequency was 13 KHZ at a temperature of 77 k.
- There should be a space between number and unit (see “Spaces” below).

### References

The usual convention is:

- Citations use square brackets.  
Superfluidity was discovered in  $^4\text{He}$  in 1937 [1] and in  $^3\text{He}$  in 1972 [2,3].
- Equations use round brackets.  
The fitting function is Eq. (4).
- Sections, figures, and tables don’t use brackets, but figure panels do.  
Figure 2(a) shows data from the devices listed in Table 3.

### Acronyms and abbreviations

- Acronyms should be defined once, at first usage.  
The devices were measured using electron spin resonance (ESR).  
Element symbols (C, Cu, Cr) and other obvious acronyms (such as AC) don’t need to be defined.
- Acronyms and abbreviations should usually be spelled out at the beginning of a sentence (except for clunky ones, like SQUID).  
Figure 1 and Figs. 3-4 show the ESR signal before illumination. Electron spin resonance was not seen after illumination.
- Acronyms are usually best avoided in titles and abstracts.

## Capitals

Capitals should be used:

- Everywhere English grammar expects them.
- When referring to specific sections, figures, tables, etc.  
We sealed the samples under different pressures (see Table 1).
- In element abbreviations (H, He).
- In acronyms, usually (SEM, FWHM).

They should not be used:

- In element names.  
Forming gas is a mixture of hydrogen and nitrogen.      not      Forming gas is a mixture of Hydrogen and Nitrogen.
- When defining acronyms.  
Devices were imaged in a scanning electron microscope (SEM).      not      Devices were imaged in a Scanning Electron Microscope (SEM).
- In titles, usually (although it's OK if you are consistent).

## Italic and roman fonts

*Italic font* is used:

- As usual in non-scientific English.
- For mathematical variables.  
Here *c* is the speed of light.      not      Here c is the speed of light.  
We sum over the particle coordinates  $x_i$ .      not      We sum over the particle coordinates  $x_i$ .

Roman font is used in all other situations, including:

- In chemical formulas.  
The fullerenes were dissolved in CS<sub>2</sub>.      not      The fullerenes were dissolved in *CS*<sub>2</sub>.
- For standard mathematical functions such as sin and ln. (In Latex, write `\sin` etc.)
- In abbreviations and labels, even inside equations.  
The quality factor of Resonator A is defined as  
$$Q_A = \frac{f}{f_{FWHM}}$$
      not      The quality factor of Resonator A is defined as  
$$Q_A = \frac{f}{f_{FWHM}}$$

## Spaces

Spaces should be used:

- Between numbers and units.  
The wavelength is  $\lambda = 1.55 \times 10^{-6}$  m.      not      The wavelength is  $\lambda = 1.55 \times 10^{-6}$ m.
- Before references.  
The conductance was simulated using the GOLLUM package [1].      not      The conductance was simulated using the GOLLUM package[1].

You can avoid line breaks using the Latex non-breaking space `~`, or in Word using Insert → Symbol → Special Characters → Nonbreaking space.

The thermal conductivity is also lower, consistent with the Wiedemann-Franz law [1].      not      The thermal conductivity is also lower, consistent with the Wiedemann-Franz law [1].

## Punctuation

Commas and full stops should generally be used as in ordinary English.

- Combining equations with punctuation can be tricky. Most writers treat equations as parts of sentences, as follows:

The speed of sound  $v$  is held constant across all fits.

The quality factor is  $Q = f/f_{\text{FWHM}}$ , where  $f$  is the centre frequency and we have defined a full width at half-maximum  $f_{\text{FWHM}} = f_2 - f_1$ .

Maxwell's equations predict that the refractive index of a linear medium is

$$n = \sqrt{\epsilon_r \mu_r}.$$

This leads to the following equation:

$$\frac{D}{\mu} = \frac{kT}{q}.$$

Avoid standalone equations:

The resonance is fitted to the Lorentzian lineshape

$$V(f) = \frac{A}{(f - f_0)^2 + (\Delta f/2)^2}. \quad (1)$$

not

The resonance is fitted to the Lorentzian lineshape given by Eq. (1).

$$V(f) = \frac{A}{(f - f_0)^2 + (\Delta f/2)^2}. \quad (1)$$

- Don't let an equation interfere with the grammar of nearby sentences.

The impedance of the inductor  $L$  is

$$Z = j\omega L$$

where  $\omega$  is the angular frequency.

or

The impedance of the inductor  $L$  is

$$Z = j\omega L.$$

Here  $\omega$  is the angular frequency.

The impedance of the inductor  $L$  is

$$Z = j\omega L.$$

Where  $\omega$  is the angular frequency.

not

## Figures

- Every figure needs exactly one caption, even if it has multiple panels (a), (b), (c).
- Choose figure font sizes similar to your main text, and use them consistently.
- When you show a fit, say in the caption which equation it comes from and what the free parameters are.

## Writing like a professional

### Style that makes you look like an amateur

Some types of writing that are fine in informal usage make you look silly in a formal document.

- Don't be needlessly inconsistent, even in minor details. If you call the phase  $\varphi$  in the text and  $\phi$  in a figure, you waste the reader's effort and undermine their trust. Be pedantic in editing to avoid these errors.
- Don't use a comma where grammar allows a full stop. (This is called a [comma splice](#) and is bad because it usually makes the reader work harder.)

The barrier is aluminium arsenide

doped with silicon. Gallium arsenide is  
used as a capping layer.

not

The barrier is aluminium arsenide

doped with silicon, gallium arsenide is  
used as a capping layer.

- Don't start a sentence with "and" or "but", or use contractions like "don't".

### Style that makes you look like a professional

This is always difficult, but here is some advice:

- The overriding principle of this guide is that you should work more to let the reader work less. If you make it easy for the reader to understand your simple points, they will try harder to understand your difficult ones. If they are your examiner, your peer reviewer, or your investor, this is probably what you want.
- Good writing is usually concise.
- Figures are often even more important than text; many scientists treat them as the first step of writing.
- Follow Steven Pinker's [13 rules for good writing](#). If you want to motivate yourself to write well, read Chapter 1 of Joshua Schimel's [Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded](#). (Ask Edward to lend you one of his copies.)