These brief “lessons” are designed to address common mistakes in English usage and to administer instruction in small, palatable doses.
Quotation marks around a word or phrase indicate that it is being used in a new or unconventional meaning

The resonance is an extra tunneling channel, or “window,” in the barrier. Tunnelling electrons having total energy $E + E$ are always able to “see” the window, but do not necessarily exit through it.

Enclose the word in quotation marks at only the first usage

Use “double” quotation marks

Note in this example, “window” is enclosed in quotation marks the first time it is used (in Line 2), but not the second time (in Line 4).

“See” is enclosed in quotation marks because the electrons are inanimate objects and are thus not able to “see” anything.

Always use double quotation marks (“ ”), not single quotation marks (’ ’), to indicate a nonstandard usage. The only time single quotes are used is if the nonstandard word is part of a direct quotation, e.g.,

Several years ago, James Martin and his colleagues at Sandia National Laboratories in Albuquerque, New Mexico, thought they might use these competing effects to fine tune particle arrangements that they would eventually solidify into useful materials. But when they built an apparatus to control and change the magnetic field strength over time in three perpendicular directions, the particles did things that were "unbelievably complicated," Martin says. "It was overwhelming, the number of things that we discovered." Along the way, he recalls, "we'd see these little 'tornados' in the solution." http://focus.aps.org/story/v24/st1
Do not use quotation marks around standard nomenclature

Finite-energy nonperiodic wave forms can be analyzed into sinusoids by the Fourier transform.

Not sure if your word is “standard nomenclature”? Look it up in the AIP Style Manual’s “Correct or Preferred Spellings of Frequently Occurring Words”


Also note that wave form is written as two words, according to AIP. The only three “wave” words that are written closed are waveguide, waveheight, and wavelength; write everything else as separate words.

wave breaking
wave field
wave form
wave front
wave function
waveguide
waveheight
wavelength
wave number
wave packet
wave speed
wave train
wave vector

I have to look up “wave form” and “waveguide” and “wave function” every single time. <sigh>
Do not use quotation marks to set off letters used as symbols from running text

The fundamental equation that governs the propagation of the acoustic wave in such a non-linear system is given in Lagrangian coordinates, where $\xi^1$ and $\alpha^1$ refer to the displacements of Lagrangian particles and the Lagrangian coordinates, respectively.¹

Remember to italicize the letters

Remember to put letters (both Roman and Greek) that refer to physical parameters in italics to set them off from the rest of the text.
In US usage, periods and commas are placed inside* quotation marks

But Šimůnek realized that even in a thick material, “the sideways direction is important because these sideways bonds are broken first,” he says. “This is surprising, because people usually think that hardness is related to bonds that prevent the close approach of atoms during compression.”

Colons and semicolons go outside; question marks and exclamation marks can go either inside or outside

*As in many other things in English, the Brits do just the opposite


Question marks and exclamation marks go either inside or outside (depending on whether they’re part of what is being quoted), as shown in the following examples:

The postdoc asked, “Where did you put the frazzlejamber, Pat?”

What exactly did he mean by “frazzlejamber”?

Unfortunately, Pat had broken the “frazzlejamber”!

“Pat, that thing cost $40 000!” shouted the postdoc.

Point of order—don’t use a lot of exclamation marks in scientific writing; people will think you’re a crackpot!!!!