Scientific and technical communication in English

M2 Physics

Ian Sims

Acknowledgements
Some of this material is taken from the following websites :
http://www.unice.fr/scientificenglish/
http://users.wpi.edu/~nab/sci_eng/

Course objectives

Provide opportunities for students to :

- listen
- speak
- read
- write

in English

Writing : changing tense and person

When writing scientific articles, the passive tense (third person impersonal) is usually preferred.

Instead of

I use a mode-locked laser to generate the optical frequency comb.

write

A mode locked laser was used to generate the optical frequency comb.

Exercise:

Change the following text into the passive tense:

We use the technique of pulsed laser photolysis to study the kinetics of the reaction between CN and 1,3 butadiene. I am using the quadrupled output of a pulsed Nd:YAG laser operating at 266 nm to photodissociate ICN to generate CN radicals, and my student operates a tuneable optical parametric oscillator which he sets to 388.3 nm to detect them.

Writing : changing tense and person

Exercise:

Change the following text into the passive tense:

We use the technique of pulsed laser photolysis to study the kinetics of the reaction between CN and 1,3 butadiene. I am using the quadrupled output of a pulsed Nd:YAG laser operating at 266 nm to photodissociate ICN to generate CN radicals, and my student operates a tuneable optical parametric oscillator which he sets to 388.3 nm to detect them.

Answer:

The technique of pulsed laser photolysis was used to study the kinetics of the reaction between CN and 1,3 butadiene. The quadrupled output of a pulsed Nd:YAG laser operating at 266 nm was used to generate CN radicals by photodissociating ICN. The CN radicals were detected using a tuneable optical parametric oscillator operating at 388.3 nm.

Writing : Adjective or Adverb?

"In Figure 4, the subdomains oriented perpendicular to the scan direction (more specifically, those with their tilt direction perpendicularly to the scan direction)...."

What is wrong with this phrase?

"In Figure 4, the subdomains oriented perpendicularly to the scan direction (more specifically, those with their tilt direction perpendicular to the scan direction)...."

Practice

1. The derivation was easy debated. easily debated
2. The easy derivation was debated. OK
3. The slope of the second curve is steeper than the first one. OK
4. The slope drops off more steep. steeply
5. Preliminary results were previously published. OK
6. Previous results were too preliminary. OK

Writing : Accuracy and Precision not the same in Scientific English

Accuracy – the degree to which a result agrees with the theoretical value.

Precision – how well that result can be repeated.

Do the sentences below indicate accuracy, precision, or both?

1. As the gun warmed up, it was hard to repeatedly hit the target. **precision**
2. The students reported that the speed of light is 2 x 10^8 m/s, an error of -33%. **accuracy**
3. The rest mass of the neutron is 1.008 665 012 amu (atomic mass units) with 0.037 ppm (parts per million) error. **accuracy and precision**
4. Our mean value was 50 GPa; our standard deviation was 5 GPa. **precision**
5. The R value from the least-squares fit was 0.987. **precision**
6. We used a standard to calibrate our instrument. We think that the values we obtained are good to within 5%. **accuracy**
7. If you can measure the fine structure constant to three significant figures (137), then you don't have a very good instrument. However, if you can measure it to nine significant figures (137.035 963), then I want to see your lab! **precision**
8. The reproducibility of the experiment is a few degrees Centigrade. The temperature can be measured to plus or minus five degrees.

accuracy and precision

Physics terms – exercise

1. A minimum point in a wave or an alternating signal.
2. Any system for specifying the precise location of objects in space
3. Field created by any object with mass, extending outward in all directions, which determines the influence of that object on all others.
4. Mass times velocity; a quantity that determines the potential force that an object can impart to another object by collision
5. The highest part of a wave
6. The force of gravity acting on a body, equal to the mass of the body multiplied by the acceleration of gravity
7. A wave in which the vibrations of the medium are perpendicular to the direction the wave is moving.
8. The distance measured from crest to crest of one complete wave or cycle.
9. An accelerator in which two beams of particles are forced to collide head on
10. The matter in the universe that is not directly observable as it emits no light
11. A curved, ground and polished piece of glass or other transparent material used for the refraction of light

1. trough
2. frame of reference
3. field of gravitation
4. momentum
5. wave crest
6. weight
7. transverse wave
8. wavelength
9. particle collider
10. dark matter
11. lens

courtesy University of Nice - Sophia Antipolis

Writing : Some Useful Latin Words

ad hoc	for the special purpose or end
anno Domini (A.D.)	in the year of our Lord; a date after Christ
ante meridiem (a.m.)	before noon
post meridiem (p.m.)	after noon
circa (ca.)	about; used especially in approximate dates
et alia (et al.)	and others; and elsewhere
et cetera (etc.)	and others; and so forth; and so on
exempli gratia (e.g.)	for example; such as
ibidem (ibid.)	in the aforementioned place
idem	the same as previously given
id est (i.e.)	that is

Writing : Some Useful Latin Words (cont)

in situ	a. in place or position; undisturbed b. in a localized state or condition
ex situ	the opposite of *in situ*
opere citato (op. cit.)	in the work cited (In other words, *op. cit.* means that you don't know the page number.)
sic	thus; so. Used to indicate that a surprising word in the text is not a mistake or is quoted verbatim.
vice versa	conversely; in reverse order from that stated
vide	see
vide ante	see before
vide infra	see below
vide post	see after
vide supra	see above
videlicet (viz.)	that is to say; namely

Writing : Some Useful Latin Words - Quiz

1. This concept was explained earlier in this chapter (**vide** p.342).
2. The paper by Smith **et al.** disagrees with your findings.
3. The experiment was performed **in situ or ex situ**.
4. Friction is manifest in everyday life: the brakes of cars, skating on ice, **etc.**
5. For the moment, we concentrate on explaining the first effect (_____ for the second effect). **vide ante, vide infra, vide post, vide supra**
6. I. Can B. Funny, The Journal of Irreproducible Results 42, 300 (2000); **idem or ibid.** p. 412.
7. I. Can B. Funny, The Journal of Irreproducible Results, **op.cit.** (2000).
8. I have many meetings today, **i.e. or viz.,** students at 11:00, lunch at 12:30, and class at 15:00.
9. I have many meetings today, **e.g.,** students at 11:00.
10. He was born **ca.** 40 B.C. (Before Christ)
11. He was born 32 **A.D.**
12. I'll meet you at the train station at 3:00 **a.m. or p.m.**
13. He signed his name as e.e. cummings (**sic**).
14. She likes me and **vice versa**.
15. The committee was formed **ad hoc** to look into that problem.

'The'

1. Before singular or plural nouns and noun phrases that denote particular specified people or things.
2. Before a singular noun, making it generic: '*the human arm*.'
3. Before a noun, and generally stressed, emphasizing its uniqueness or prominence: '*That's THE show to see this year*.'
4. Before a title of rank or office, designating its holder: '*The President arrives tomorrow*.'
5. Before an adjective, extending it to signify a class and giving it the function of a noun: '*the rich, the beautiful*'.
6. Before an adjective used absolutely: '*the finest we have to offer*.'
7. Before a present participle, signifying the action in the abstract: '*the weaving of rugs*'.
8. Before a noun, with the force of 'per': '*at a dollar the box*'.

'The' (continued)

1. **The** microscope in the corner is broken.
2. optical microscopes have resolutions of about one micron.
3. **The** scanning probe microscope supercedes **the** optical limit.
4. scanning probe microscopes can do better than that.
5. I haven't read such a good paper in a long time. It's **the** publication of the year.
6. Please have a look at **the** publication that appeared yesterday.
7. Please read publications.
8. President Badoux visited our lab yesterday.
9. **The** President visited our lab yesterday.
10. **The** educated are responsible voters.
11. educated people are responsible voters.
12. It's **the** best work we can do.
13. better work is impossible.
14. **The** imaging of surfaces at the nanometer scale is now possible.
15. We can make images of surfaces at the nanometer scale.
16. My consulting rates are $1000 **the** day.