科学技術英語2C

第11回

大槻　東巳

2.5　ラテン語

科学論文に出てくる主なラテン語を列記する。すべて省略形である。[9] 原則として斜体，頻繁に使われ英語として用いられるようになったものは立体 (`http://wwwsoc.nii.ac.jp/jps/jpsj/jshiori/etc/writing_memo.html`)

ca. about (circa)

cf. conFER

e.g. for exAMple (exEMpli GRAtia)

et al. and Others (et Alii)

in situ in place

etc. et CETera

ibid. in the same place (Ibidem)

i.e. that is (id est)

vs. VERsus

2.7　professions

科学者 SCIentist

技術者 engiNEER

数学者 mathemaTIcian

物理学者 PHYsicist (phySIcian は医者)

天文学者 astROnomer, AStronaut は宇宙飛行士

化学者 CHEMist

生物学者 biOLogist

動 (植物) 学者 zoOLogist (BOtanist)

機械工学者 meCHAnical engiNEER

電気工学者 eLECtrical engiNEER

light

- light : a kind of electromagnetic wave
- Its velocity is 3.00 x 10^8 [m/s]. (The circumference of the Earth is 40,000 km.)
  - A stationary satellite: Kepler's 3rd law→36,000 km above. $(24 \text{ hours}/84 \text{ minutes})^2=(420000/6400)^3$
- electromagnetic spectrum（スペクトル）: The range of electromagnetic waves extending in frequency from radio waves to gamma rays.
  - radio wave<microwave<infrared<visible light<ultraviolet<X rays<gamma rays
  - red<green<violet
- quiz: plural form of spectrum?

spectra, c.f. phenomenon->phenomena, datum→data

material properties

- transparent: Light can pass through it.
- opaque: Light is absorbed without reemission and thus light cannot pass.

reflection, refraction and diffraction

- principle of least time, Snell's law
- total internal reflection
- diffraction: The bending of light that passes around an obstacle or through a narrow slit, causing the light to spread. (cf. deflect)

- reflection (反射), refraction（屈折）, telescope（望遠鏡）, microscope（顕微鏡）

modern theory of light

- light quantum (pl. quanta)
- Planck’s constant
- photoelectric effect: The emission of electrons from a metal surface when light shines upon it.

elementary particles

- fermion: electron, proton, neutron, nucleon, quark (up, down, strange, charm, top, bottom)
- boson: photon, gluon, W-boson, Z-boson

radioactivity

- alpha, beta and gamma rays
  - alpha ray: He nuclei
  - beta ray: electron
  - gamma ray: electromagnetic wave
- isotope
- decay, half-life

transmutation of elements

- natural transmutation, artificial transmutation
- radioactive isotopes
  - radiometric dating (carbon dating, uranium dating)
- mass-energy equivalence

$$E = mc^2$$

nuclear fission and fusion

- nuclear fission:
  - chain reaction, critical mass $^{1}_{0}n + ^{235}_{92}\mathrm{U} \rightarrow ^{91}_{36}\mathrm{Kr} + ^{142}_{56}\mathrm{Ba} + 3^{1}_{0}n$
  - nuclear reactor
  - breeder reactor $^{1}_{0}n + ^{238}_{92}\mathrm{U} \rightarrow ^{239}_{92}\mathrm{U} \rightarrow ^{239}_{93}\mathrm{Np} + \mathrm{e}^{-} \rightarrow ^{239}_{94}\mathrm{Pu} + \mathrm{e}^{-}$

- nuclear fusion: deuteron (nucleus of deuterium), triton (nucleus of tritium)

$$2^{2}_{1}\mathrm{H} \rightarrow ^{3}_{2}\mathrm{He} + ^{1}_{0}n + 3.26\mathrm{MeV}$$

$$^{2}_{1}\mathrm{H} + ^{3}_{1}\mathrm{H} \rightarrow ^{4}_{2}\mathrm{He} + ^{1}_{0}n + 17.6\mathrm{MeV}$$

relativity

- The special principle of relativity states that physical laws should be the same in all inertial reference frames.
- The general principle of relativity states that physical laws are the same in all reference frames -- inertial or non-inertial.
- The equivalence principle: The gravitational "force" as experienced locally is actually the same as the pseudo-force experienced by an observer in a non-inertial (accelerated) frame.

Special theory of relativity

- frame of reference
- special theory of relativity:
  - postulates: 1) All laws of nature are the same in all uniformly moving frames of reference. 2) The speed of light in free space has the same measured value regardless of the motion of the source or the motion of the observer; that is, the speed of light is a constant.
- simultaneity, spacetime, time dilation, length contraction

general theory of relativity

- principle of equivalence: Observations made in an accelerated frame of reference are indistinguishable from those made in a gravitational field.
- gravitational red shift, geodesic

学生番号　　氏名

quiz

- 特殊相対性原理，一般相対性原理を日本語で述べよ。
- $E=mc^2$の読みを書くこと。