

Proper use of L^AT_EX

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Abstract. How to properly write scientific text using L^AT_EX. Many people make many typographical mistakes, even journals make them. And because I am quite pedantic about this, here is a list of how it should be done. Unfortunately for you, it is not up for debate, it is just the way it is written below. *Authors of scientific literature are likely to have no clue about all this! Editors of scientific literature are (arguably a little less) likely to have no clue either!* Typesetters of scientific literature know something, but they too make mistakes; see *e.g.* J. Micromech. Microeng., with an italic ‘mu’ in micrometer.

Following the rules here, I think you’ll find it much easier to read math. Mathematical typography requires attention to detail. You should understand the difference in meaning between $\mu_p = \left(\frac{T}{100}\right)^p$ and $\mu_p = \left(\frac{T}{100}\right)^p$. Perhaps then you’ll appreciate the beauty of written mathematical language.

Have fun!

For a less agitated (and better, but longer) text on scientific typesetting, see [Beccari(1997)].

1. Packages

Have a look at the preamble of this document. Useful packages are: `siunitx` for writing units, `booktabs` for making nice tables, `amsmath` mostly for the `\text` command.

For IOP journals, use the modified LaTeX package used by this package, in order to use `siunitx` and `amsmath`.

2. Units

Units should be **upright**, not italic. Why? Because in most contexts, $10\textit{cm}^2$ means ten times the speed of light times variable m squared. Ten centimeter squared should be typeset as 10cm^2 , written in L^AT_EX as `10~cm2`, or (better) using the `siunitx` package: `\SI{10}{cm^2}`. Note the thin space between number and unit. The package documentation of `siunitx` is well worth reading.

Micrometer is abbreviated by μm , note that the ‘mu’ is upright! μm is wrong and means something like permeability times meter? Compare with an acceleration of $10g\text{ N m}^{-2}$, where g is the standard gravity; and 10 g N m^{-2} , meaning 10 grams Newton per meter squared. An interesting unit is the ‘kilo Watt hour’ unit kWh: 11 kWh and 11 kWh m^{-1} (note the behaviour of `siunitx`: (absence of) thin space between ‘W’ and ‘h’).

In tables, the units should **not be between square brackets**. Correct usage of the brackets: $[F] = \text{N}$, so you hardly ever want to use that. If you want, you can put the units between normal parens $()$.

3. Subscripts

Subscripts in math should in most of *our* cases be **upright**. Why? Because a subscript in italic has a mathematical meaning; an upright subscript is just simple text, meaning a word or abbreviation of something. To write an upright subscript, use `\text`, e.g.

`k_{eff}`, k_{eff} .

Symbols	Meaning
E_x	electric field in x direction
E_{plate}	electric field due to some charged plate
k_{eff}	k with indices e , f , and f . So e.g. k_{122}
k_{eff}	effective k (e.g. an effective spring stiffness)
n_i	n with index i , e.g. $\sum_{i=1}^{10} n_i$
n_i	n with subscript abbreviation ‘i’, perhaps intrinsic carrier concentration
m_e	electron mass
k_B	some k having to do with a magnetic field B ?
k_B	$= 1.3806504(24) \times 10^{-23} \text{ J K}^{-1}$
E_{xmax}	yuk!
$E_{x,\text{max}}$	neat!
\int	lots of indices!
$\int_{\text{all space}}$	superb

4. Misc math stuff

Symbols	Meaning
$\cos(2\pi)$	c times o times $s(2\pi)$ (probably s is a function)
$\cos(2\pi)$	$= 1$
$\cos^{-1}(2\pi)$	$= 1$
$\arccos(2\pi)$	argument 2π is outside the domain of the inverse cosine function
$\exp(\dots)$	e times x times \dots
$\exp(\dots)$	e^{\dots} , this is probably what you meant

5. Approximately, proportional to, plus-minus

If something (for example, a measurement error or actuation range) ranges from $-50\mu\text{m}$ to $50\mu\text{m}$, you write that as $\text{\SI{+-50}{\micrometers}}$, $\pm 50\mu\text{m}$. If something is approximately $50\mu\text{m}$, you write $\text{\sim\SI{50}{\micrometers}}$, $\sim 50\mu\text{m}$, or $\text{\$E \sim 5\$}$, $E \sim 5$, or $\text{\$E \approx 5\$}$, $E \approx 5$. If E is proportional to T , you write $\text{\$E \propto T\$}$, $E \propto T$.

6. Quotes

Use **double quotes** for **real quotations**, i.e. text that has actually been said or written. “For example,” Johan said. Use **single quotes** for ‘strange’ words. Note that the start and end quotes are different! Use ‘ at the start, and ’ at the end.

[Beccari(1997)] Beccari C, 1997 “Typesetting mathematics for science and technology according to ISO 31/XI” *TUGboat* **18**, pp. 39–48 URL <http://www.tug.org/TUGboat/Articles/tb18-1/tb54becc.pdf>