The `hepparticles` package for LaTeX

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Typesetting the names of high-energy fundamental particles (and their elementary composites) is well-defined by a set of rules:

- The basic particle name consists of a large Roman or Greek symbol with optional following sub- and super-scripts.
- If describing a specific particle the symbols should be upright; if describing a generic class of particles they should be italicised (where possible). In italic and bold contexts the symbols should adapt by becoming bold and italic themselves where possible.
- Anti-particles are written with a bar on top of the main symbol (but for aesthetic reasons the bar does not extend above the sub- and super-scripts.
- Supersymmetric partners of Standard Model particles are written as for anti-particles but with a tilde in place of the bar.
- Resonant states may sport an extra resonance specifier consisting of a value in parentheses and optinal following sub- and super-scripts. This follows the main particle name.

Several issues arise when typesetting these particle names in standard LaTeX: for starters the requirement of sub- and super-scripts and the need to use Greek symbols forces us into math mode. But math mode does not usually follow the surrounding text context for boldness and italicism: this has been fixed in this specific case by use of the `maybemath` package. Secondly, the positions of super-scripts with overlines and tildes are affected: this is also corrected by this package. The commands available are as follows:

- For generic particle names e.g. all positively charged leptons:
  `\HepGenParticle`$\{main\}\{subscript\}\{superscript\}$
  `\HepGenAntiParticle`$\{main\}\{subscript\}\{superscript\}$

- For concrete particle names:
  `\HepParticle`$\{main\}\{subscript\}\{superscript\}$
  `\HepAntiParticle`$\{main\}\{subscript\}\{superscript\}$

- For supersymmetric "sparticles":
  `\HepGenSusyParticle`$\{main\}\{subscript\}\{superscript\}$
  `\HepSusyParticle`$\{main\}\{subscript\}\{superscript\}$

- For resonance specifiers (just the parenthetic term):
  `\HepResonance`$\{mainTermInParenths\}\{subscript\}\{superscript\}$

- For a full particle name and resonance specification:
  `\HepParticleResonance`$\{mainparticle\}\{res\}\{resSub\}\{resSup\}$
  `\HepParticleResonanceFull`$\{main\}\{sub\}\{sup\}\{res\}\{resSub\}\{resSup\}$

- And finally, for containing processes describing particle evolution;
  `\HepProcess`$\{iParticles$ `\HepTo` $fParticles\}$
  where `\HepTo` is a normal `\to` arrow with a bit of extra space.

giving typeset particle names as follows:

- Normal particles: B^0_d, $\overline{\mathrm{B}}^0_\mathrm{d}$
- Generic particles: q_d, $\overline{\ell}_\mu$
- SUSY particles: $\widetilde{\chi}_1$, $\widetilde{q}_2$
- Resonances: $J/\psi\,(1\mathrm{S})^\star$
- Process: $\mathrm{B}^0_\mathrm{d} \;\to\; \mathrm{K}^-\pi^+$.

Any feedback is appreciated! Email to `andy@insectnation.org`, please.