The hepnames packages for LaTeX

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The hepnames, heppennames and hepnicenames packages provide a large, though not entirely comprehensive, library of established high-energy particle names. These are flexibly typeset using the hepparticles package, which gracefully adapts the particle typesetting depending on context.

heppennames re-implements and augments the particle entity notation scheme (PEN) using hepparticles macros; hepnicenames uses an alternative, more intuitive macro naming scheme to access the simple subset of PEN symbols; and hepnames is a convenience interface to both notations simultaneously.

Several missing particles have been implemented to augment the naming scheme. As well as distinct particle states that were missing in the original implementation, alternative representations and "simple forms" of existing PEN states have been added, occasionally with minimal renaming.

Particle names not in this scheme can be easily implemented using hepparticles. Contributions to the package, including requests, are of course encouraged.

1 Introduction

hepnicenames provides a less formally prescribed but more "natural language" set of macro names to access the particle names. Listings of macro-to-particle mappings can be found in the accompanying heppennames and hepnicenames PDF and PS files and in this document. All of the macros can be used both in and out of math mode. Unlisted particles can be easily implemented using hepparticles directly: please contact the author if you find a missing state, so it can be added to the library.

2 Package options

Both `heppennames` and `hepnicenames` support the `hepparticles` options, simply passing those options to `hepparticles`. Loading more than one of the packages with contradictory options has undefined behaviour, at least as far as the author is concerned! For your convenience, the `hepparticles` options documentation is repeated below:

By request, the package now typesets particles in italic as well as upright convention. The choice of convention can be made when the package is loaded with the `italic` and `notitalic` options, e.g. `\usepackage[italic]{hepnames}`. The default mode is upright (i.e. `notitalic`).

In addition, the `forceit` option will force *everything* in particle names to be italic, even if they aren't normally italic in math mode (such as Arabic numerals). Note that the italic font that will appear here is that used by `\mathit` and so will appear more script-like than normal math mode. I can't say that I recommend using this option, but it's there for flexibility's sake.

Finally, a pair of options, `maybess` and `noss`, are available: using `maybess` will allow particle names to be typeset in sans-serif if the surrounding context is sans-serif and `noss` has the converse effect. Note that since there is no italic sans-serif math font in LaTeX, generic particle names will not be typeset in italic sans font. Maybe this behaviour will change in future if there's lots of enthusiasm for a fix. However, it looks pretty good at the moment and I suspect most people will want sans-serif particle names in sans documents, so `maybess` is set by default.

3 Installation

Requirements: You will need to be using a LaTeX 2_ε system, and have installed copies of the `hepparticles` package and the `maybemath` package on which it depends.

To install, simply copy the `hep*names.sty` files into a location in your `LATEXINPUTS` path. Tada!

Now we move on to the lists of macro names in the `hepnicenames` and `heppennames` schemes. I'm taken the liberty of placing the `hepnicenames` macros first, since for most purposes they're more intuitive, memorable and (dare I say it?) modern than the PEN codes.

4 hepnicenames macros

The scheme for the naming of these macros is less rigorous than PEN, but is still largely prescribed. The main features of the "nicename" macro naming scheme are:

- All particle macros start with \P, all antiparticle macros with \AP. In some cases, such as the positron, both \Ppositron and \APelectron are provided for the e^+ symbol, so as not to surprise the user.
- The core of the name is the particle type name in natural language and appropriately capitalised, e.g. B, Lambda etc.
- The optional end part of the command usually specifies the super- or sub-script state qualifier, e.g. \PBplus for the B^+ symbol, \PZzero for a Z with an explicit superscript zero. The "zero", "plus", "minus" and "pm"/"mp" strings (for $\pm$ or $\mp$ respectively) are implemented for every state for which they are possible.

To combine particle sybol macros in reaction expressions, you should use the hepparticles \HepProcess macro, which groups particles together with nice spacings, including a re-defined \to macro. Complex PEN-specified particles (essentially, the set of excited states with resonance qualifiers) have not been implemented in the "nicenames" scheme. A prime motivation for this is that LaTeX does not support numbers in macro names: spelling the resonance mass numbers out as words would be lengthy and ridiculous, so the PEN scheme is pretty much as easy to remember as any other in my opinion. Okay, that's not quite true: "nicenames" macros with the "i, ii, iii"/"a, b, c" suffixes would probably be easier, but unless there's demand for that feature, I can't be bothered implementing it!

- \hepnicenames ⇒ hepnicenames
- \PB ⇒ B
- \PBpm ⇒ $B^{\pm}$
- \PBmp ⇒ $B^{\mp}$
- \PBplus ⇒ B^+
- \PBminus ⇒ B^-
- \PBzero ⇒ B^0
- \PBstar ⇒ B^*
- \PBd ⇒ B^0_d
- \PBu ⇒ B^+
- \PBc ⇒ B^+_c
- \PBs ⇒ B^0_s
- \APB ⇒ $\overline{B}$
- \APBzero ⇒ $\overline{B}^0$

- \APBd ⇒ $\overline{\mathrm{B}}{}^0_{\mathrm{d}}$
- \APBu ⇒ B^-
- \APBc ⇒ $\mathrm{B}_{\mathrm{c}}^-$
- \APBs ⇒ $\overline{\mathrm{B}}{}^0_{\mathrm{s}}$
- \PK ⇒ K
- \PKpm ⇒ $\mathrm{K}^{\pm}$
- \PKmp ⇒ $\mathrm{K}^{\mp}$
- \PKplus ⇒ K^+
- \PKminus ⇒ K^-
- \PKzero ⇒ K^0
- \PKshort ⇒ $\mathrm{K}^0_{\mathrm{S}}$
- \PKs ⇒ $\mathrm{K}^0_{\mathrm{S}}$
- \PKlong ⇒ $\mathrm{K}^0_{\mathrm{L}}$
- \PKl ⇒ $\mathrm{K}^0_{\mathrm{L}}$
- \PKstar ⇒ K^*
- \APK ⇒ $\overline{\mathrm{K}}{}^0$
- \APKzero ⇒ $\overline{\mathrm{K}}{}^0$
- \Pphoton ⇒ γ
- \Pgamma ⇒ γ
- \Pphotonx ⇒ γ^*
- \Pgammastar ⇒ γ^*
- \Pgluon ⇒ g
- \PW ⇒ W
- \PWpm ⇒ $\mathrm{W}^{\pm}$
- \PWmp ⇒ $\mathrm{W}^{\mp}$
- \PWplus ⇒ W^+
- \PWminus ⇒ W^-
- \PWprime ⇒ W'
- \PZ ⇒ Z
- Z with a zero
  \PZzero ⇒ Z^0
- Z-prime
  \PZprime ⇒ Z'
- axion
  \Paxion ⇒ A^0
- \Pfermion ⇒ f
- \Pfermionpm ⇒ $f^{\pm}$
- \Pfermionmp ⇒ $f^{\mp}$
- \Pfermionplus ⇒ f^+
- \Pfermionminus ⇒ f^-
- \APfermion ⇒ $\bar{f}$
- lepton
  \Plepton ⇒ ℓ
- charged lepton
  \Pleptonpm ⇒ $\ell^{\pm}$
- charged lepton
  \Pleptonmp ⇒ $\ell^{\mp}$
- positive lepton
  \Pleptonplus ⇒ ℓ^+

- negative lepton
  \Pleptonminus $\Rightarrow \ell^-$
- anti-lepton
  \APlepton $\Rightarrow \bar{\ell}$
- neutrino
  \Pnu $\Rightarrow \nu$
- antineutrino
  \APnu $\Rightarrow \bar{\nu}$
- neutrino
  \Pneutrino $\Rightarrow \nu$
- antineutrino
  \APneutrino $\Rightarrow \bar{\nu}$
- lepton-flavour neutrino
  \Pnulepton $\Rightarrow \nu_\ell$
- lepton-flavour antineutrino
  \APnulepton $\Rightarrow \bar{\nu}_\ell$
- \Pe $\Rightarrow$ e
- \Pepm $\Rightarrow \mathrm{e}^{\pm}$
- \Pemp $\Rightarrow \mathrm{e}^{\mp}$
- \Pelectron $\Rightarrow \mathrm{e}^-$
- \APelectron $\Rightarrow \mathrm{e}^+$
- \Ppositron $\Rightarrow \mathrm{e}^+$
- \APpositron $\Rightarrow \mathrm{e}^+$
- \Pmu $\Rightarrow \mu$
- \Pmupm $\Rightarrow \mu^{\pm}$
- \Pmump $\Rightarrow \mu^{\mp}$
- \Pmuon $\Rightarrow \mu^-$
- \APmuon $\Rightarrow \mu^+$
- \Ptau $\Rightarrow \tau$
- \Ptaupm $\Rightarrow \tau^{\pm}$
- \Ptaump $\Rightarrow \tau^{\mp}$
- \Ptauon $\Rightarrow \tau^-$
- \APtauon $\Rightarrow \tau^+$
- \Pnue $\Rightarrow \nu_\mathrm{e}$
- \Pnum $\Rightarrow \nu_\mu$
- \Pnut $\Rightarrow \nu_\tau$
- \APnue $\Rightarrow \overline{\nu}_\mathrm{e}$
- \APnum $\Rightarrow \overline{\nu}_\mu$
- \APnut $\Rightarrow \overline{\nu}_\tau$
- \Pquark $\Rightarrow q$
- \APquark $\Rightarrow \bar{q}$
- \Pdown $\Rightarrow$ d
- \Pup $\Rightarrow$ u
- \Pstrange $\Rightarrow$ s
- \Pcharm $\Rightarrow$ c
- \Pbottom $\Rightarrow$ b
- \Pbeauty $\Rightarrow$ b
- \Ptop $\Rightarrow$ t
- \Ptruth $\Rightarrow$ t

- \APdown ⇒ $\overline{\mathrm{d}}$
- \APqd ⇒ $\overline{\mathrm{d}}$
- \APup ⇒ $\overline{\mathrm{u}}$
- \APqu ⇒ $\overline{\mathrm{u}}$
- \APstrange ⇒ $\overline{\mathrm{s}}$
- \APqs ⇒ $\overline{\mathrm{s}}$
- \APcharm ⇒ $\overline{\mathrm{c}}$
- \APqc ⇒ $\overline{\mathrm{c}}$
- \APbottom ⇒ $\overline{\mathrm{b}}$
- \APbeauty ⇒ $\overline{\mathrm{b}}$
- \APqb ⇒ $\overline{\mathrm{b}}$
- \APtop ⇒ $\overline{\mathrm{t}}$
- \APtruth ⇒ $\overline{\mathrm{t}}$
- \APqt ⇒ $\overline{\mathrm{t}}$
- \Pproton ⇒ p
- \Pneutron ⇒ n
- \APproton ⇒ $\overline{\mathrm{p}}$
- \APneutron ⇒ $\overline{\mathrm{n}}$
- \Pchic ⇒ χ_{c}
- \PDelta ⇒ E^0
- \PLambda ⇒ Λ
- \APLambda ⇒ $\overline{\Lambda}$
- \PLambdac ⇒ Λ_{c}^+
- \PLambdab ⇒ Λ_{b}
- \POmega ⇒ Ω
- \POmegapm ⇒ $\Omega^{\pm}$
- \POmegamp ⇒ $\Omega^{\mp}$
- \POmegaplus ⇒ Ω^+
- \POmegaminus ⇒ Ω^-
- \APOmega ⇒ $\overline{\Omega}$
- \APOmegaplus ⇒ $\overline{\Omega}^+$
- \APOmegaminus ⇒ $\overline{\Omega}^-$
- \PSigma ⇒ Σ
- \PSigmapm ⇒ $\Sigma^{\pm}$
- \PSigmamp ⇒ $\Sigma^{\mp}$
- \PSigmaminus ⇒ Σ^-
- \PSigmaplus ⇒ Σ^+
- \PSigmazero ⇒ Σ^0
- \PSigmac ⇒ Σ_{c}
- \APSigmaminus ⇒ $\overline{\Sigma}^-$
- \APSigmaplus ⇒ $\overline{\Sigma}^+$
- \APSigmazero ⇒ $\overline{\Sigma}^0$
- \APSigmac ⇒ $\overline{\Sigma}_{\mathrm{c}}$
- \PUpsilon ⇒ Υ
- \PUpsilonOneS ⇒ $\Upsilon(1\mathrm{S})$
- \PUpsilonTwoS ⇒ $\Upsilon(2\mathrm{S})$
- \PUpsilonThreeS ⇒ $\Upsilon(3\mathrm{S})$

- \PUpsilonFourS ⇒ $\Upsilon(4S)$
- \PXi ⇒ Ξ
- \PXiplus ⇒ Ξ^{+}
- \PXiminus ⇒ Ξ^{-}
- \PXizero ⇒ Ξ^{0}
- \APXiplus ⇒ $\overline{\Xi}^{+}$
- \APXiminus ⇒ $\overline{\Xi}^{-}$
- \APXizero ⇒ $\overline{\Xi}^{0}$
- \PXicplus ⇒ Ξ_{c}^{+}
- \PXiczero ⇒ Ξ_{c}^{0}
- \Pphi ⇒ ϕ
- \Peta ⇒ η
- \Petaprime ⇒ $\eta^{\prime}$
- \Petac ⇒ η_{c}
- \Pomega ⇒ ω
- \Ppi ⇒ π
- \Ppipm ⇒ $\pi^{\pm}$
- \Ppimp ⇒ $\pi^{\mp}$
- \Ppiplus ⇒ π^{+}
- \Ppiminus ⇒ π^{-}
- \Ppizero ⇒ π^{0}
- \Prho ⇒ ρ
- \Prhoplus ⇒ ρ^{+}
- \Prhominus ⇒ ρ^{-}
- \Prhopm ⇒ $\rho^{\pm}$
- \Prhomp ⇒ $\rho^{\mp}$
- \Prhozero ⇒ ρ^{0}
- \PJpsi ⇒ J/ψ
- \PJpsiOneS ⇒ $\mathrm{J}/\psi(1\mathrm{S})$
- \Ppsi ⇒ ψ
- \PpsiTwoS ⇒ $\psi(2\mathrm{S})$
- \PD ⇒ D
- \PDpm ⇒ $\mathrm{D}^{\pm}$
- \PDmp ⇒ $\mathrm{D}^{\mp}$
- \PDzero ⇒ D^{0}
- \PDminus ⇒ D^{-}
- \PDplus ⇒ D^{+}
- \PDstar ⇒ D^{*}
- \APD ⇒ $\overline{\mathrm{D}}$
- \APDzero ⇒ $\overline{\mathrm{D}}^{0}$
- \PDs ⇒ $\mathrm{D_s}$
- \PDsminus ⇒ $\mathrm{D_s^{-}}$
- \PDsplus ⇒ $\mathrm{D_s^{+}}$
- \PDspm ⇒ $\mathrm{D_s^{\pm}}$
- \PDsmp ⇒ $\mathrm{D_s^{\mp}}$
- \PDsstar ⇒ $\mathrm{D_s^{*}}$
- \PHiggs ⇒ H

- \PHiggsheavy ⇒ H
- \PHiggslight ⇒ h
- \PHiggsheavyzero ⇒ H^{0}
- \PHiggslightzero ⇒ h^{0}
- \PHiggsps ⇒ A
- \PHiggspszero ⇒ A^{0}
- \PHiggsplus ⇒ H^{+}
- \PHiggsminus ⇒ H^{-}
- \PHiggspm ⇒ $\mathrm{H}^{\pm}$
- \PHiggsmp ⇒ $\mathrm{H}^{\mp}$
- \PHiggszero ⇒ H^{0}
- \PSHiggs ⇒ $\widetilde{\mathrm{H}}$
- \PSHiggsino ⇒ $\widetilde{\mathrm{H}}$
- \PSHiggsplus ⇒ $\widetilde{\mathrm{H}}^{+}$
- \PSHiggsinoplus ⇒ $\widetilde{\mathrm{H}}^{+}$
- \PSHiggsminus ⇒ $\widetilde{\mathrm{H}}^{-}$
- \PSHiggsinominus ⇒ $\widetilde{\mathrm{H}}^{-}$
- \PSHiggspm ⇒ $\widetilde{\mathrm{H}}^{\pm}$
- \PSHiggsinopm ⇒ $\widetilde{\mathrm{H}}^{\pm}$
- \PSHiggsmp ⇒ $\widetilde{\mathrm{H}}^{\mp}$
- \PSHiggsinomp ⇒ $\widetilde{\mathrm{H}}^{\mp}$
- \PSHiggszero ⇒ $\widetilde{\mathrm{H}}^{0}$
- \PSHiggsinozero ⇒ $\widetilde{\mathrm{H}}^{0}$
- bino
- bino
  \PSBino ⇒ $\widetilde{\mathrm{B}}$
- \PSW ⇒ $\widetilde{\mathrm{W}}$
- \PSWplus ⇒ $\widetilde{\mathrm{W}}^{+}$
- \PSWminus ⇒ $\widetilde{\mathrm{W}}^{-}$
- \PSWpm ⇒ $\widetilde{\mathrm{W}}^{\pm}$
- \PSWmp ⇒ $\widetilde{\mathrm{W}}^{\mp}$
- \PSWino ⇒ $\widetilde{\mathrm{W}}$
- \PSWinopm ⇒ $\widetilde{\mathrm{W}}^{\pm}$
- \PSWinomp ⇒ $\widetilde{\mathrm{W}}^{\mp}$
- \PSZ ⇒ $\widetilde{\mathrm{Z}}$
- \PSZzero ⇒ $\widetilde{\mathrm{Z}}^{0}$
- \PSe ⇒ $\widetilde{\mathrm{e}}$
- photino
  \PSphoton ⇒ $\widetilde{\gamma}$
- photino
  \PSphotino ⇒ $\widetilde{\gamma}$
- photino
  \Pphotino ⇒ $\widetilde{\gamma}$
- smuon
  \PSmu ⇒ $\widetilde{\mu}$
- sneutrino
  \PSnu ⇒ $\widetilde{\nu}$
- stau
  \PStau ⇒ $\widetilde{\tau}$

- neutralino/chargino
  \PSino $\Rightarrow \widetilde{\chi}$
- neutralino/chargino
  \PSgaugino $\Rightarrow \widetilde{\chi}$
- chargino pm
  \PScharginopm $\Rightarrow \widetilde{\chi}^{\pm}$
- chargino mp
  \PScharginomp $\Rightarrow \widetilde{\chi}^{\mp}$
- neutralino
  \PSneutralino $\Rightarrow \widetilde{\chi}^{0}$
- lightest neutralino
  \PSneutralinoOne $\Rightarrow \widetilde{\chi}_1^0$
- next-to-lightest neutralino
  \PSneutralinoTwo $\Rightarrow \widetilde{\chi}_2^0$
- gluino
  \PSgluino $\Rightarrow \widetilde{\mathrm{g}}$
- slepton
  \PSlepton $\Rightarrow \widetilde{\ell}$
- slepton
  \PSslepton $\Rightarrow \widetilde{\ell}$
- duplicate slepton macro
  \Pslepton $\Rightarrow \widetilde{\ell}$
- anti-slepton
  \APSlepton $\Rightarrow \bar{\widetilde{\ell}}$
- anti-slepton
  \APslepton $\Rightarrow \bar{\widetilde{\ell}}$
- \PSq $\Rightarrow \widetilde{q}$
- \Psquark $\Rightarrow \widetilde{q}$
- \APSq $\Rightarrow \bar{\widetilde{q}}$
- \APsquark $\Rightarrow \bar{\widetilde{q}}$
- \PSdown $\Rightarrow \widetilde{\mathrm{d}}$
- \PSup $\Rightarrow \widetilde{\mathrm{u}}$
- \PSstrange $\Rightarrow \widetilde{\mathrm{s}}$
- \PScharm $\Rightarrow \widetilde{\mathrm{c}}$
- \PSbottom $\Rightarrow \widetilde{\mathrm{b}}$
- \PStop $\Rightarrow \widetilde{\mathrm{t}}$
- \PASdown $\Rightarrow \bar{\widetilde{\mathrm{d}}}$
- \PASup $\Rightarrow \bar{\widetilde{\mathrm{u}}}$
- \PASstrange $\Rightarrow \bar{\widetilde{\mathrm{s}}}$
- \PAScharm $\Rightarrow \bar{\widetilde{\mathrm{c}}}$
- \PASbottom $\Rightarrow \bar{\widetilde{\mathrm{b}}}$
- \PAStop $\Rightarrow \bar{\widetilde{\mathrm{t}}}$
- \eplus $\Rightarrow \mathrm{e}^{+}$
- \eminus $\Rightarrow \mathrm{e}^{-}$

5 heppennames macros

heppennames re-implements and augments the particles in the particle entity notation (PEN) scheme, specifically the pennames.sty LaTeX style. In several cases, simplified forms of the original PEN macros (e.g. Z^0's without the superscript zero, J/ψ(1S) without the resonance specifier...) have been provided. Where this is the case, the PEN notation has usually been changed to make the simpler form of the symbol correspond to the simplest macro name.

- \hepnames ⇒ hepnames
- \heppennames ⇒ heppennames
- \PB ⇒ B
- \PBpm ⇒ $\mathrm{B}^{\pm}$
- \PBmp ⇒ $\mathrm{B}^{\mp}$
- \PBp ⇒ B^{+}
- \PBm ⇒ B^{-}
- \PBz ⇒ B^{0}
- \PBst ⇒ B^{*}
- \PdB ⇒ $\mathrm{B}_{\mathrm{d}}^{0}$
- \PuB ⇒ B^{+}
- \PcB ⇒ $\mathrm{B}_{\mathrm{c}}^{+}$
- \PsB ⇒ $\mathrm{B}_{\mathrm{s}}^{0}$
- \PaB ⇒ $\overline{\mathrm{B}}$
- \PaBz ⇒ $\overline{\mathrm{B}}^{0}$
- \PadB ⇒ $\overline{\mathrm{B}}_{\mathrm{d}}^{0}$
- \PauB ⇒ B^{-}
- \PacB ⇒ $\mathrm{B}_{\mathrm{c}}^{-}$
- \PasB ⇒ $\overline{\mathrm{B}}_{\mathrm{s}}^{0}$
- kaon
  \PK ⇒ K
- charged kaon
  \PKpm ⇒ $\mathrm{K}^{\pm}$
- charged kaon
  \PKmp ⇒ $\mathrm{K}^{\mp}$
- negative kaon
  \PKm ⇒ K^{-}
- positive kaon
  \PKp ⇒ K^{+}
- neutral kaon
  \PKz ⇒ K^{0}
- K-long
  \PKzL ⇒ $\mathrm{K}_{\mathrm{L}}^{0}$
- K-short
  \PKzS ⇒ $\mathrm{K}_{\mathrm{S}}^{0}$
- K star
  \PKst ⇒ K^{*}

- anti-kaon
  \PaK ⇒ $\overline{\mathrm{K}}$
- neutral anti-kaon
  \PaKz ⇒ $\overline{\mathrm{K}}^0$
- \PKeiii ⇒ $\mathrm{K}_{\mathrm{e}3}$
- \PKgmiii ⇒ $\mathrm{K}_{\mu 3}$
- \PKzeiii ⇒ $\mathrm{K}^0_{\mathrm{e}3}$
- \PKzgmiii ⇒ $\mathrm{K}^0_{\mu 3}$
- \PKia ⇒ $\mathrm{K}_1(1400)$
- \PKii ⇒ $\mathrm{K}_2(1770)$
- \PKi ⇒ $\mathrm{K}_1(1270)$
- \PKsti ⇒ $\mathrm{K}^*(892)$
- \PKsta ⇒ $\mathrm{K}^*(1370)$
- \PKstb ⇒ $\mathrm{K}^*(1680)$
- \PKstiii ⇒ $\mathrm{K}^*_3(1780)$
- \PKstii ⇒ $\mathrm{K}^*_2(1430)$
- \PKstiv ⇒ $\mathrm{K}^*_4(2045)$
- \PKstz ⇒ $\mathrm{K}^*_0(1430)$
- \PN ⇒ N
- \PNa ⇒ $\mathrm{N}(1440)\,\mathrm{P}_{11}$
- \PNb ⇒ $\mathrm{N}(1520)\,\mathrm{D}_{13}$
- \PNc ⇒ $\mathrm{N}(1535)\,\mathrm{S}_{11}$
- \PNd ⇒ $\mathrm{N}(1650)\,\mathrm{S}_{11}$
- \PNe ⇒ $\mathrm{N}(1675)\,\mathrm{D}_{15}$
- \PNf ⇒ $\mathrm{N}(1680)\,\mathrm{F}_{15}$
- \PNg ⇒ $\mathrm{N}(1700)\,\mathrm{D}_{13}$
- \PNh ⇒ $\mathrm{N}(1710)\,\mathrm{P}_{11}$
- \PNi ⇒ $\mathrm{N}(1720)\,\mathrm{P}_{13}$
- \PNj ⇒ $\mathrm{N}(2190)\,\mathrm{G}_{17}$
- \PNk ⇒ $\mathrm{N}(2220)\,\mathrm{H}_{19}$
- \PNl ⇒ $\mathrm{N}(2250)\,\mathrm{G}_{19}$
- \PNm ⇒ $\mathrm{N}(2600)\,\mathrm{I}_{1,11}$
- gluon
  \Pg ⇒ g
- photon
  \Pgg ⇒ γ
- photon*
  \Pggx ⇒ γ^*
- W boson
  \PW ⇒ W
- charged W boson
  \PWpm ⇒ $\mathrm{W}^{\pm}$
- charged W boson
  \PWmp ⇒ $\mathrm{W}^{\mp}$
- W-plus
  \PWp ⇒ W^+
- W-minus
  \PWm ⇒ W^-
- \PWR ⇒ W_{R}

- W-prime boson
  \PWpr ⇒ W'
- Z boson
  \PZ ⇒ Z
- neutral Z boson
  \PZz ⇒ Z^0
- Z-prime boson
  \PZpr ⇒ Z'
- left-right Z boson
  \PZLR ⇒ Z_{LR}
- \PZgc ⇒ Z_χ
- \PZge ⇒ Z_η
- \PZgy ⇒ Z_ψ
- \PZi ⇒ Z_1
- axion
  \PAz ⇒ A^0
- standard/heavy Higgs
  \PH ⇒ H
- explicitly neutral standard/heavy Higgs
  \PHz ⇒ H^0
- light Higgs
  \Ph ⇒ h
- explicitly neutral light Higgs
  \Phz ⇒ h^0
- pseudoscalar Higgs
  \PA ⇒ A
- explicitly neutral pseudoscalar Higgs
  \PAz ⇒ A^0
- charged Higgs
  \PHpm ⇒ $\mathrm{H}^\pm$
- charged Higgs
  \PHmp ⇒ $\mathrm{H}^\mp$
- positive-charged Higgs
  \PHp ⇒ H^+
- negative-charged Higgs
  \PHm ⇒ H^-
- fermion
  \Pf ⇒ f
- charged fermion
  \Pfpm ⇒ $f^\pm$
- charged fermion
  \Pfmp ⇒ $f^\mp$
- positive fermion
  \Pfp ⇒ f^+
- negative fermion
  \Pfm ⇒ f^-
- anti-fermion
  \Paf ⇒ $\bar{f}$
- lepton
  \Pl ⇒ ℓ
- charged lepton
  \Plpm ⇒ $\ell^\pm$
- charged lepton
  \Plmp ⇒ $\ell^\mp$

- positive lepton
  \Plp ⇒ ℓ^+
- negative lepton
  \Plm ⇒ ℓ^-
- anti-lepton
  \Pal ⇒ $\bar{\ell}$
- generic neutrino
  \Pgn ⇒ ν
- neutrino (for lepton ell)
  \Pgnl ⇒ ν_ℓ
- generic anti-neutrino
  \Pagn ⇒ $\bar{\nu}$
- anti-neutrino (for lepton ell)
  \Pagnl ⇒ $\bar{\nu}_\ell$
- electronic
  \Pe ⇒ e
- e plus/minus
  \Pepm ⇒ $\mathrm{e}^\pm$
- e minus/plus
  \Pemp ⇒ $\mathrm{e}^\mp$
- electron
  \Pem ⇒ e^-
- positron
  \Pep ⇒ e^+
- muonic
  \Pgm ⇒ μ
- mu plus/minus
  \Pgmpm ⇒ $\mu^\pm$
- mu minus/plus
  \Pgmmp ⇒ $\mu^\mp$
- muon
  \Pgmm ⇒ μ^-
- anti-muon
  \Pgmp ⇒ μ^+
- tauonic
  \Pgt ⇒ τ
- tau plus/minus
  \Pgtpm ⇒ $\tau^\pm$
- tau minus/plus
  \Pgtmp ⇒ $\tau^\mp$
- tau lepton
  \Pgtm ⇒ τ^-
- anti-tau
  \Pgtp ⇒ τ^+
- electron neutrino
  \Pgne ⇒ ν_e
- muon neutrino
  \Pgngm ⇒ ν_μ
- tau neutrino
  \Pgngt ⇒ ν_τ
- electron anti-neutrino
  \Pagne ⇒ $\overline{\nu}_\mathrm{e}$
- muon anti-neutrino
  \Pagngm ⇒ $\overline{\nu}_\mu$
- tau anti-neutrino
  \Pagngt ⇒ $\overline{\nu}_\tau$

- quark
  \Pq ⇒ q
- anti-quark
  \Paq ⇒ $\bar{q}$
- down quark
  \Pqd ⇒ d
- up quark
  \Pqu ⇒ u
- strange quark
  \Pqs ⇒ s
- charm quark
  \Pqc ⇒ c
- bottom quark
  \Pqb ⇒ b
- top quark
  \Pqt ⇒ t
- down anti-quark
  \Paqd ⇒ $\overline{\mathrm{d}}$
- up anti-quark
  \Paqu ⇒ $\overline{\mathrm{u}}$
- strange anti-quark
  \Paqs ⇒ $\overline{\mathrm{s}}$
- charm anti-quark
  \Paqc ⇒ $\overline{\mathrm{c}}$
- bottom anti-quark
  \Paqb ⇒ $\overline{\mathrm{b}}$
- top anti-quark
  \Paqt ⇒ $\overline{\mathrm{t}}$
- \Pqb ⇒ b
- \Pqc ⇒ c
- \Pqd ⇒ d
- \Pqs ⇒ s
- \Pqt ⇒ t
- \Pqu ⇒ u
- \Pq ⇒ q
- anti-bottom quark
  \Paqb ⇒ $\overline{\mathrm{b}}$
- anti-charm quark
  \Paqc ⇒ $\overline{\mathrm{c}}$
- anti-down quark
  \Paqd ⇒ $\overline{\mathrm{d}}$
- anti-strange quark
  \Paqs ⇒ $\overline{\mathrm{s}}$
- anti-top quark
  \Paqt ⇒ $\overline{\mathrm{t}}$
- anti-up quark
  \Paqu ⇒ $\overline{\mathrm{u}}$
- anti-quark
  \Paq ⇒ $\bar{q}$
- proton
  \Pp ⇒ p
- neutron
  \Pn ⇒ n
- anti-proton
  \Pap ⇒ $\overline{\mathrm{p}}$

- anti-neutron
  \Pan $\Rightarrow \overline{\mathrm{n}}$
- \Pcgc $\Rightarrow \chi_{\mathrm{c}}$
- \Pcgcii $\Rightarrow \chi_{\mathrm{c2}}(1\mathrm{P})$
- \Pcgci $\Rightarrow \chi_{\mathrm{c1}}(1\mathrm{P})$
- \Pcgcz $\Rightarrow \chi_{\mathrm{c0}}(1\mathrm{P})$
- \Pfia $\Rightarrow \mathrm{f}_1(1390)$
- \Pfib $\Rightarrow \mathrm{f}_1(1510)$
- \Pfiia $\Rightarrow \mathrm{f}_2(1720)$
- \Pfiib $\Rightarrow \mathrm{f}_2(2010)$
- \Pfiic $\Rightarrow \mathrm{f}_2(2300)$
- \Pfiid $\Rightarrow \mathrm{f}_2(2340)$
- \Pfiipr $\Rightarrow \mathrm{f}_2'(1525)$
- \Pfii $\Rightarrow \mathrm{f}_2(1270)$
- \Pfiv $\Rightarrow \mathrm{f}_4(2050)$
- \Pfi $\Rightarrow \mathrm{f}_1(1285)$
- \Pfza $\Rightarrow \mathrm{f}_0(1400)$
- \Pfzb $\Rightarrow \mathrm{f}_0(1590)$
- \Pfz $\Rightarrow \mathrm{f}_0(975)$
- \PgD $\Rightarrow \mathrm{E}^0$
- \PgDa $\Rightarrow \mathrm{E}^0(1232)\,\mathrm{P}_{33}$
- \PgDb $\Rightarrow \mathrm{E}^0(1620)\,\mathrm{S}_{31}$
- \PgDc $\Rightarrow \mathrm{E}^0(1700)\,\mathrm{D}_{33}$
- \PgDd $\Rightarrow \mathrm{E}^0(1900)\,\mathrm{S}_{31}$
- \PgDe $\Rightarrow \mathrm{E}^0(1905)\,\mathrm{F}_{35}$
- \PgDf $\Rightarrow \mathrm{E}^0(1910)\,\mathrm{P}_{31}$
- \PgDh $\Rightarrow \mathrm{E}^0(1920)\,\mathrm{P}_{33}$
- \PgDi $\Rightarrow \mathrm{E}^0(1930)\,\mathrm{D}_{35}$
- \PgDj $\Rightarrow \mathrm{E}^0(1950)\,\mathrm{F}_{37}$
- \PgDk $\Rightarrow \mathrm{E}^0(2420)\,\mathrm{H}_{3,11}$
- \PgL $\Rightarrow \Lambda$
- \PagL $\Rightarrow \overline{\Lambda}$
- \PcgLp $\Rightarrow \Lambda_{\mathrm{c}}^{+}$
- \PbgL $\Rightarrow \Lambda_{\mathrm{b}}$
- \PgLa $\Rightarrow \Lambda(1405)\,\mathrm{S}_{01}$
- \PgLb $\Rightarrow \Lambda(1520)\,\mathrm{D}_{03}$
- \PgLc $\Rightarrow \Lambda(1600)\,\mathrm{P}_{01}$
- \PgLd $\Rightarrow \Lambda(1670)\,\mathrm{S}_{01}$
- \PgLe $\Rightarrow \Lambda(1690)\,\mathrm{D}_{03}$
- \PgLf $\Rightarrow \Lambda(1800)\,\mathrm{S}_{01}$
- \PgLg $\Rightarrow \Lambda(1810)\,\mathrm{P}_{01}$
- \PgLh $\Rightarrow \Lambda(1820)\,\mathrm{F}_{05}$
- \PgLi $\Rightarrow \Lambda(1830)\,\mathrm{D}_{05}$
- \PgLj $\Rightarrow \Lambda(1890)\,\mathrm{P}_{03}$
- \PgLk $\Rightarrow \Lambda(2100)\,\mathrm{G}_{07}$
- \PgLl $\Rightarrow \Lambda(2110)\,\mathrm{F}_{05}$
- \PgLm $\Rightarrow \Lambda(2350)\,\mathrm{H}_{09}$

- \PgO ⇒ Ω
- \PgOpm ⇒ $\Omega^{\pm}$
- \PgOmp ⇒ $\Omega^{\mp}$
- \PgOp ⇒ Ω^{+}
- \PgOm ⇒ Ω^{-}
- \PgOma ⇒ $\Omega(2250)^{-}$
- new
- \PagOp ⇒ $\overline{\Omega}^{+}$
- \PagOm ⇒ $\overline{\Omega}^{-}$
- \PgS ⇒ Σ
- \PgSpm ⇒ $\Sigma^{\pm}$
- \PgSmp ⇒ $\Sigma^{\mp}$
- \PgSm ⇒ Σ^{-}
- \PgSp ⇒ Σ^{+}
- \PgSz ⇒ Σ^{0}
- \PcgS ⇒ Σ_{c}
- \PagSm ⇒ $\overline{\Sigma}^{-}$
- \PagSp ⇒ $\overline{\Sigma}^{+}$
- \PagSz ⇒ $\overline{\Sigma}^{0}$
- \PacgS ⇒ $\overline{\Sigma}_{\mathrm{c}}$
- \PgSa ⇒ $\Sigma(1385)\,\mathrm{P}_{13}$
- \PgSb ⇒ $\Sigma(1660)\,\mathrm{P}_{11}$
- \PgSc ⇒ $\Sigma(1670)\,\mathrm{D}_{13}$
- \PgSd ⇒ $\Sigma(1750)\,\mathrm{S}_{11}$
- \PgSe ⇒ $\Sigma(1775)\,\mathrm{D}_{15}$
- \PgSf ⇒ $\Sigma(1915)\,\mathrm{F}_{15}$
- \PgSg ⇒ $\Sigma(1940)\,\mathrm{D}_{13}$
- \PgSh ⇒ $\Sigma(2030)\,\mathrm{F}_{17}$
- \PgSi ⇒ $\Sigma(2050)$
- \PcgSi ⇒ $\Sigma_{\mathrm{c}}(2455)$
- \PgU ⇒ Υ
- \PgUi ⇒ $\Upsilon(1\mathrm{S})$
- \PgUa ⇒ $\Upsilon(2\mathrm{S})$
- \PgUb ⇒ $\Upsilon(3\mathrm{S})$
- \PgUc ⇒ $\Upsilon(4\mathrm{S})$
- \PgUd ⇒ $\Upsilon(10860)$
- \PgUe ⇒ $\Upsilon(11020)$
- \PgX ⇒ Ξ
- \PgXp ⇒ Ξ^{+}
- \PgXm ⇒ Ξ^{-}
- \PgXz ⇒ Ξ^{0}
- \PgXa ⇒ $\Xi(1530)\,\mathrm{P}_{13}$
- \PgXb ⇒ $\Xi(1690)$
- \PgXc ⇒ $\Xi(1820)\,\mathrm{D}_{13}$
- \PgXd ⇒ $\Xi(1950)$
- \PgXe ⇒ $\Xi(2030)$
- \PagXp ⇒ $\overline{\Xi}^{+}$

- \PagXm $\Rightarrow \overline{\Xi}^{-}$
- \PagXz $\Rightarrow \overline{\Xi}^{0}$
- \PcgXp $\Rightarrow \Xi_{c}^{+}$
- \PcgXz $\Rightarrow \Xi_{c}^{0}$
- \Pgf $\Rightarrow \phi$
- \Pgfi $\Rightarrow \phi(1020)$
- \Pgfa $\Rightarrow \phi(1680)$
- \Pgfiii $\Rightarrow \phi_3(1850)$
- \Pgh $\Rightarrow \eta$
- \Pghpr $\Rightarrow \eta'$
- \Pcgh $\Rightarrow \eta_c$
- \Pgha $\Rightarrow \eta(1295)$
- \Pghb $\Rightarrow \eta(1440)$
- \Pghpri $\Rightarrow \eta'(958)$
- \Pcghi $\Rightarrow \eta_c(1S)$
- \Pgo $\Rightarrow \omega$
- \Pgoi $\Rightarrow \omega(783)$
- \Pgoa $\Rightarrow \omega(1390)$
- \Pgob $\Rightarrow \omega(1600)$
- \Pgoiii $\Rightarrow \omega(3)^{1670}$
- pion
  \Pgp $\Rightarrow \pi$
- charged pion
  \Pgppm $\Rightarrow \pi^{\pm}$
- charged pion
  \Pgpmp $\Rightarrow \pi^{\mp}$
- negative pion
  \Pgpm $\Rightarrow \pi^{-}$
- positive pion
  \Pgpp $\Rightarrow \pi^{+}$
- neutral pion
  \Pgpz $\Rightarrow \pi^{0}$
- \Pgpa $\Rightarrow \pi(1300)$
- \Pgpii $\Rightarrow \pi_2(1670)$
- resonance removed
  \Pgr $\Rightarrow \rho$
- \Pgrp $\Rightarrow \rho^{+}$
- \Pgrm $\Rightarrow \rho^{-}$
- \Pgrpm $\Rightarrow \rho^{\pm}$
- \Pgrmp $\Rightarrow \rho^{\mp}$
- \Pgrz $\Rightarrow \rho^{0}$
- new
  \Pgri $\Rightarrow \rho(770)$
- \Pgra $\Rightarrow \rho(1450)$
- \Pgrb $\Rightarrow \rho(1700)$
- \Pgriii $\Rightarrow \rho_3(1690)$
- \PJgy $\Rightarrow \mathrm{J}/\psi$

- \PJgyi ⇒ $J/\psi(1S)$
- \Pgy ⇒ ψ
- \Pgyii ⇒ $\psi(2S)$
- \Pgya ⇒ $\psi(3770)$
- \Pgyb ⇒ $\psi(4040)$
- \Pgyc ⇒ $\psi(4160)$
- \Pgyd ⇒ $\psi(4415)$
- \PD ⇒ D
- \PDpm ⇒ $D^{\pm}$
- \PDmp ⇒ $D^{\mp}$
- \PDz ⇒ D^{0}
- \PDm ⇒ D^{-}
- \PDp ⇒ D^{+}
- \PDst ⇒ D^{*}
- \PaD ⇒ $\overline{D}$
- \PaDz ⇒ $\overline{D}^{0}$
- new 2005-07-08
  \PsD ⇒ D_s
- \PsDm ⇒ D_s^{-}
- \PsDp ⇒ D_s^{+}
- \PsDpm ⇒ $D_s^{\pm}$
- \PsDmp ⇒ $D_s^{\mp}$
- \PsDst ⇒ D_s^{*}
- \PsDipm ⇒ $D_{s1}(2536)^{\pm}$
- \PsDimp ⇒ $D_{s1}(2536)^{\mp}$
- \PDiz ⇒ $D_1(2420)^{0}$
- \PDstiiz ⇒ $D_2^{*}(2460)^{0}$
- \PDstpm ⇒ $D^{*}(2010)^{\pm}$
- \PDstmp ⇒ $D^{*}(2010)^{\mp}$
- \PDstz ⇒ $D^{*}(2010)^{0}$
- \PgD ⇒ E^{0}
- \PEz ⇒ E^{0}
- \PLpm ⇒ $L^{\pm}$
- \PLmp ⇒ $L^{\mp}$
- \PLz ⇒ L^{0}
- \Paii ⇒ $a_2(1320)$
- \Pai ⇒ $a_1(1260)$
- \Paz ⇒ $a_0(980)$
- \Pbgcia ⇒ $\chi_{b1}(2P)$
- \Pbgciia ⇒ $\chi_{b2}(2P)$
- \Pbgcii ⇒ $\chi_{b2}(1P)$
- \Pbgci ⇒ $\chi_{b1}(1P)$
- \Pbgcza ⇒ $\chi_{b0}(2P)$
- \Pbgcz ⇒ $\chi_{b0}(1P)$
- \Pbi ⇒ $b_1(1235)$
- \Phia ⇒ $h_1(1170)$

- Higgsino
  \PSH $\Rightarrow \widetilde{\mathrm{H}}$
- positive Higgsino
  \PSHp $\Rightarrow \widetilde{\mathrm{H}}^{+}$
- negative Higgsino
  \PSHm $\Rightarrow \widetilde{\mathrm{H}}^{-}$
- charged Higgsino
  \PSHpm $\Rightarrow \widetilde{\mathrm{H}}^{\pm}$
- charged Higgsino
  \PSHmp $\Rightarrow \widetilde{\mathrm{H}}^{\mp}$
- neutral Higgsino
  \PSHz $\Rightarrow \widetilde{\mathrm{H}}^{0}$
- wino
  \PSW $\Rightarrow \widetilde{\mathrm{W}}$
- positive wino
  \PSWp $\Rightarrow \widetilde{\mathrm{W}}^{+}$
- negative wino
  \PSWm $\Rightarrow \widetilde{\mathrm{W}}^{-}$
- wino pm
  \PSWpm $\Rightarrow \widetilde{\mathrm{W}}^{\pm}$
- wino mp
  \PSWmp $\Rightarrow \widetilde{\mathrm{W}}^{\mp}$
- zino
  \PSZ $\Rightarrow \widetilde{\mathrm{Z}}$
- zino
  \PSZz $\Rightarrow \widetilde{\mathrm{Z}}^{0}$
- bino
  \PSB $\Rightarrow \widetilde{\mathrm{B}}$
- selectron
  \PSe $\Rightarrow \widetilde{\mathrm{e}}$
- photino
  \PSgg $\Rightarrow \widetilde{\gamma}$
- smuon
  \PSgm $\Rightarrow \widetilde{\mu}$
- sneutrino
  \PSgn $\Rightarrow \widetilde{\nu}$
- stau
  \PSgt $\Rightarrow \widetilde{\tau}$
- chargino/neutralino
  \PSgx $\Rightarrow \widetilde{\chi}$
- chargino pm
  \PSgxpm $\Rightarrow \widetilde{\chi}^{\pm}$
- chargino mp
  \PSgxmp $\Rightarrow \widetilde{\chi}^{\mp}$
- neutralino
  \PSgxz $\Rightarrow \widetilde{\chi}^{0}$
- lightest neutralino
  \PSgxzi $\Rightarrow \widetilde{\chi}^{0}_{1}$
- next-to-lightest neutralino
  \PSgxzii $\Rightarrow \widetilde{\chi}^{0}_{2}$
- gluino
  \PSg $\Rightarrow \widetilde{\mathrm{g}}$
- slepton (generic)
  \PSl $\Rightarrow \widetilde{\ell}$
- anti-slepton (generic)
  \PaSl $\Rightarrow \bar{\widetilde{\ell}}$

- squark (generic)
  \PSq ⇒ $\widetilde{q}$
- anti-squark (generic)
  \PaSq ⇒ $\bar{\widetilde{q}}$
- down squark
  \PSqd ⇒ $\widetilde{\mathrm{d}}$
- up squark
  \PSqu ⇒ $\widetilde{\mathrm{u}}$
- strange squark
  \PSqs ⇒ $\widetilde{\mathrm{s}}$
- charm squark
  \PSqc ⇒ $\widetilde{\mathrm{c}}$
- bottom squark (sbottom)
  \PSqb ⇒ $\widetilde{\mathrm{b}}$
- top squark (stop)
  \PSqt ⇒ $\widetilde{\mathrm{t}}$
- anti-down squark
  \PaSqd ⇒ $\bar{\widetilde{\mathrm{d}}}$
- anti-up squark
  \PaSqu ⇒ $\bar{\widetilde{\mathrm{u}}}$
- anti-strange squark
  \PaSqs ⇒ $\bar{\widetilde{\mathrm{s}}}$
- anti-charm squark
  \PaSqc ⇒ $\bar{\widetilde{\mathrm{c}}}$
- anti-bottom squark
  \PaSqb ⇒ $\bar{\widetilde{\mathrm{b}}}$
- anti-top squark (stop)
  \PaSqt ⇒ $\bar{\widetilde{\mathrm{t}}}$

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

In particular, if you find that a particle name is missing, please let me know, preferably with a recommended pair of macro names (for the PEN and "nice" names) and a description of how it should by typeset. The best form is to give me an implementation in terms of the `hepparticles` macros, of course!