The Elementary Particle Entity Notation (PEN) Scheme

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Abstract

In this article an Elementary Particle Entity Notation (PEN) scheme is proposed for use with TEX and SGML. This scheme not only assures the typographic correctness of the printed symbols, but also eases the automatic extraction of information about the article by the recognition of the entity names.

1 Typographical rules for scientific texts

In scientific texts the printed form of a symbol often implies a meaning which is not easily captured by generic markup. Therefore authors using some form of generic coding (like LATEX or SGML) need to know about typographical conventions. The following is a brief summary of the most important rules for composing scientific texts [1, 2].

1. The most important rule is **consistency**: a symbol should always be the same, whether it appears in a formula or in the text, on the main line or as a superscript or subscript. That is, in TEX, once you have used a symbol inside mathematics mode ('$'), always use it inside mathematics mode. Inside math mode, TEX by default prints characters in *italics*.

   For scientific work, however, quite a few symbols must be set in **roman** (upright) characters[1]. This is the case for the following families of symbols, which represent the names of:

   - units, such as g, cm, s, keV. Note that physical constants are usually in italics, so units involving constants are mixed roman-italics, e.g. GeV/c (where the c is italic because it symbolizes the speed of light, a constant);
   - particles, for example p, K, q, H. For elementary particles the PEN (Particle Entity Notation) scheme is proposed (see the next section);
   - standard mathematical functions (sin, det, cos, tan, Re, Im, etc.). Use the built-in TEX functions for these (`\sin`, etc.);
   - chemical elements, for example Ne, O, Cu;
   - numbers;
   - names of waves or states (p-wave) and covariant couplings (A for axial, V for vector), names of monopoles (E for electric, M for magnetic);
   - abbreviations that are initials or bits of words (exp, for experimental; min, for minimum);
   - the 'd' in integrands (e.g. dp).

   In all cases, following these rules will help the reader understand at first glance what one is talking about. Some instances in which it is important to use the correct symbol, in the correct type, are shown in Table 1.
2. Let your word processor do as much work as it can. Do not try to change your system's defaults too much; this will decrease the portability and maintainability of your documents. TEX implements a lot of the rules mentioned above by default in math mode.
3. Do not add blanks at random to make formulae look "nicer".
4. Refrain from using specific page layout commands (like `\break` with TEX). You will forget that you put them in your text and later wonder why some text is badly adjusted or starts a new line.

2 Entity definitions for elementary particles

In texts on high energy physics frequently reoccurring strings are the names of elementary particles. For example, the Z^0 particle can be coded in various different ways with LATEX: `$\mbox{Z}^0$`, `$\mathrm{Z^0}$` and `Z$^0$` all achieve the same typographical effect, a roman Z with a superscript 0. In the interest of standardization and typing convenience, we propose below an "entity" naming scheme, which will not only relieve the user from having to worry about the correctness of what he types, but also will allow an automatic extraction of the particle names from the input file, so that it will be easy to enter data about an article using this convention into a database of abstracts.

The naming scheme uses a notation which takes the following constraints into consideration:

1. The notation should be able to describe all particles in the particle data summary tables from the "Review of Particle Properties" [3] and any future extension to these.
2. The names should not exceed eight characters. This is the maximum length for entities in the SGML reference concrete syntax [4]. Staying within this limit means that the notation can be used with most SGML applications.

[1] With LATEX roman type in maths mode can be achieved by the `\mbox` or `\mathrm` commands.

roman type		italic type	
A	ampere (electric unit)	A	atomic number (variable)
e	electron (particle name)	e	electron charge (constant)
g	gluon (particle name)	g	gravitational constant
l	litre (volume unit)	l	length (variable)
m	metre (length unit)	m	mass (variable)
p	proton (particle name)	p	momentum (variable)
q	quark (particle name)	q	electric charge (variable)
s	second (time unit)	s	c.m. energy squared (variable)
t	tonne (weight unit)	t	time (variable)
V	volt (electric unit)	V	volume (variable)
Z	Z boson (particle name)	Z	atomic charge (variable)

Table 1: Example of differences in meaning of a symbol depending on the type.

3. Common particles such as protons and electrons should have short and simple names.
4. Items that are indicated by superscripts are indicated before items that are indicated by subscripts.

Due to the eight character limitation the mass could not be added to the name. This means that in general an entity on its own is not adequate to unambiguously identify a particle, cf. $\eta(549)$ and $\eta(1300)$ are both referred to as `Pgh`. Including mass dependences into the names is not a good idea anyway, since the mass can change with time when more precise measurements become available. The ambiguity was solved by adding a letter to the end of the name where a mass appears in the name in the particle data summary tables. Thus $\eta(549)$ is referred to as `Pgh` while $\eta(1300)$ is referred to as `Pgha`. Higher letters correspond to higher masses, in the order given in the tables.

The PEN scheme is independent of any text processing system. We have implemented it in TEX (in such a way that it may be used in all macro packages, e.g. LATEX) and SGML. The TEX implementation will print particle masses, which will be regularly updated according to the Review of Particle Properties publication. It is constructed so that the PEN name can be used in both mathematics and text mode.

2.1 Principles of the Particle Entity Notation (PEN)

Starting at the left, a name is built from the following characters:

1. Start the entity with a recognized string (in the following this was chosen as `uppercase P`). This is necessary to uniquely identify entities as following the PEN convention.
2. The following letters act as an escape to signal a special interpretation of the string. Present escape sequences are:
   - `a` for anti particle (normally represented visually with a bar over the particle's name)
   - `b` for bottom particle
   - `c` for charmed particle
   - `g` for indicating the subsequent letter is Greek. The correspondence between Latin and Greek letters is based on the notation for mathematical Greek characters used by the AAP mathematical formula application [5]:

     ```
     <!NOTATION greek2 PUBLIC "+//ISBN
      1-880124::NISO//NOTATION GREEK-2//EN">
     ```

     This one-letter correspondence is shown in Table 2.
   - `q` for quark particle
   - `s` for strange particle
   - `S` for supersymmetric particle
   - `t` for top particle
3. The one-letter name of the particle
4. Optionally followed by other information
   - `z` for zero, `i` for one, `ii` for two, `iii` for three, `iv` for four
   - `m` for minus, `p` for plus, `pm` for plus/minus
   - `pr` for prime
   - `st` for asterisk (star)
   - `L` for left-handed, `R` for right-handed
   - any one-letter particle name

Greek	name	code	Greek	name	code
α	alpha	a	A	Alpha	A
β	beta	b	B	Beta	B
γ	gamma	g	Γ	Gamma	G
δ	delta	d	Δ	Delta	D
ϵ	epsilon	e	E	Epsilon	E
ζ	zeta	z	Z	Zeta	Z
η	eta	h	H	Eta	H
θ	theta	q	Θ	Theta	Q
ι	iota	i	I	Iota	I
κ	kappa	k	K	Kappa	K
λ	lambda	l	Λ	Lambda	L
μ	mu	m	M	Mu	M
ν	nu	n	N	Nu	N
ξ	xi	x	Ξ	Xi	X
o	omicron	o	O	Omicron	O
π	pi	p	Π	Pi	P
ρ	rho	r	P	Rho	R
σ	sigma	s	Σ	Sigma	S
τ	tau	t	T	Tau	T
υ	upsilon	u	Υ	Upsilon	U
ϕ	phi	f	Φ	Phi	F
χ	chi	c	X	Chi	C
ψ	psi	y	Ψ	Psi	Y
ω	omega	w	Ω	Omega	W

Table 2: The AAP codes for the Greek letters.

2.2 Particle encodings according to the PEN Scheme

In table 3 we show how to encode the particles from the summary tables of particle properties in the "Review of Particle Properties" [3] using the PEN convention. In the rightmost column we give the computer name of the particle, as defined by "A Guide to Experimental Elementary Particle Physics Literature (1985–1989)" [6]. This is the name to be used when searching the Particle Data Group's databases. Notice that these names cannot be used for either TEX or SGML, as they do not satisfy the constraints of the PEN scheme as defined above. When a name is marked as "`not available`", sometimes a charged or neutral version exists (not given in the table).

The TEX implementation is available as a style file `pennames.sty`, which should be input in the usual way at the start of the document for TEX or specified as a minor option on the `\documentstyle` command for LATEX. To obtain the symbol required, prefix the PEN name by a backslash ('\').

The SGML implementation exists as a public entity set, that can be included in SGML documents with the following entity definition:

```
<!ENTITY % PEN PUBLIC
  "+//ISBN 92-9083-041-7::CERN//ENTITIES
     Particle Entity Names//EN">
```

Refer to a particle entity by prefixing its name by an ampersand ('&') and suffixing it with a semi-colon (';'), e.g. `&Pgr;` would give $\rho(770)$.

3 How to get the files

A file `pennames.sty` with the TEX particle name definitions, `pennames.entities` with the SGML entity names, and `pennames.ps` containing the PostScript source of this document, are available via anonymous ftp as follows (commands to be typed by the user are underlined):

```
ftp cernvm.cern.ch
Trying 128.141.2.4...
220-FTPIBM at cernvm.CERN.CH...
Name (cernvm:goossens): anonymous
230 ANONYMOU logged in with no special a...
Remote system type is VM.
ftp> cd tex.802
250 Working directory is TEX 802 (ReadOnly)
ftp> get pennames.sty
ftp> get pennames.entities
ftp> get pennames.ps
ftp> quit
```

References

[1] International Union of pure and applied Physics. *Symbols, Units, Nomenclature and Fundamental Constants in Physics.* Physica, 146A:1–67, 1987.

[2] D.E. Lowe. *A Guide to international recommendations on names and symbols for quantities and on units of measurements.* World Health Organization, Geneva, 1975.

[3] Particle Data Group. *Review of particle properties.* Physics Letters B, 239:1–516, April 1990.

[4] E. van Herwijnen. *Practical SGML.* Wolters-Kluwer Academic Publishers, Boston, 1990.

[5] American National Standards Institute. *American National Standard for Electronic Manuscript Preparation and Markup.* ANSI/NISO Z39.59-1988, 1988.

[6] Particle Data Group. *A Guide to Experimental Elementary Particle Physics Literature (1985–1989).* Lawrence Berkeley Laboratory, LBL-90 Revised, UC-414, November 1990.

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Table 3: PEN names for elementary particles in PDG list

PEN	symbol	conventional name	computer name
		Gauge and Higgs bosons	
Pgg	γ	gamma	GAMMA
PW	W	W boson	W
PWp	W^+	W plus	W+
PWm	W^-	W minus	W-
PZz	Z^0	Z zero	Z
PHz	H^0	Higgs zero	not available
PHpm	$H^\pm$	Higgs plus/minus	HIGGS+-
PWR	W_R	right-handed W	not available
PWpr	W'	W prime	WPRIME
PZLR	Z_{LR}	left-right handed Z	not available
PZgc	Z_χ	Z chi	not available
PZgy	Z_ψ	Z psi	not available
PZge	Z_η	Z eta	not available
PZi	Z_1	Z one	not available
PAz	A^0	axion	AXION
		Leptons	
Pgne	ν_e	electron neutrino	NUE
Pagne	$\overline{\nu}_e$	anti electron neutrino	NUEBAR
Pgngm	ν_μ	muon neutrino	NUMU
Pagngm	$\overline{\nu}_\mu$	anti muon neutrino	NUMUBAR
Pgngt	ν_τ	tau neutrino	NUTAU
Pagngt	$\overline{\nu}_\tau$	anti tau neutrino	not available
Pe	e	electron	not available
Pep	e^+	positron	E+
Pem	e^-	e minus	E-
Pgm	μ	muon	not available
Pgmm	μ^-	mu minus	MU-
Pgmp	μ^+	mu plus	MU+
Pgt	τ	tau	not available
PLpm	$L^\pm$	charged lepton	LEPTON+-
PLz	L^0	stable neutral heavy lepton	not available
PEz	E^0	neutral para- or ortho-lepton	not available
		Light Unflavored Mesons (S=C=B=0)	
Pgp	π	pion	PI
Pgpm	π^-	pi minus	PI-
Pgpp	π^+	pi plus	PI+
Pgppm	$\pi^\pm$	pi plus/minus	PI+-
Pgpz	π^0	pi zero	PI0
Pgh	η	eta	ETA
Pgr	$\rho(770)$	rho	RHO(770)
Pgo	$\omega(783)$	omega	OMEGA(783)
Pghpr	$\eta'(958)$	eta prime	ETAPRIME(958)
Pfz	$f_0(975)$	f zero	F0(975)
Paz	$a_0(980)$	a zero	A0(980)
Pgf	$\phi(1020)$	phi	PHI(1020)
Phia	$h_1(1170)$	h one	H1(1170)
Pbi	$b_1(1235)$	b one	not available
Pai	$a_1(1260)$	a one	A1(1260)
Pfii	$f_2(1270)$	f two	F2(1270)
Pfi	$f_1(1285)$	f one	F1(1285)
Pgha	$\eta(1295)$	eta 1295	ETA(1295)
Pgpa	$\pi(1300)$	pion 1300	not available
Paii	$a_2(1320)$	a two	A2(1320)
Pgoa	$\omega(1390)$	omega 1390	not available
Pfza	$f_0(1400)$	f zero 1400	F0(1400)
Pfia	$f_1(1390)$	f one 1420	F1(1420)

Table 3: PEN names (continued)

PEN	symbol	conventional name	computer name
Pghb	$\eta(1440)$	eta 1440	ETA(1440)
Pgra	$\rho(1450)$	rho 1450	not available
Pfib	$f_1(1510)$	f one 1510	F1(1510)
Pfiipr	$f_2'(1525)$	f two prime	F2PRIME(1525)
Pfzb	$f_0(1590)$	f zero 1590	F0(1590)
Pgob	$\omega(1600)$	omega 1600	not available
Pgoiii	$\omega_3(1670)$	omega three	OMEGA3(1670)
Pgpii	$\pi_2(1670)$	pi two	PI2(1670)
Pgfa	$\phi(1680)$	phi 1680	PHI(1680)
Pgriii	$\rho_3(1690)$	rho three	not available
Pgrb	$\rho(1700)$	rho 1700	RHO(1700)
Pfiia	$f_2(1720)$	f two 1720	F2(1720)
Pgfiii	$\phi_3(1850)$	phi three	PHI3(1850)
Pfiib	$f_2(2010)$	f two 2010	F2(2010)
Pfiv	$f_4(2050)$	f four	F4(2050)
Pfiic	$f_2(2300)$	f two 2300	F2(2300)
Pfiid	$f_2(2340)$	f two 2340	F2(2340)
Strange Mesons (S=±1, C=B=0)			
PK	K	kaon	K
PKpm	$K^{\bullet}$	K plus/minus	K+-
PKp	K^+	K plus	K+
PKm	K^-	K minus	K-
PKz	K^0	K zero	K0
PaKz	$\overline{K^0}$	anti K-zero	KBAR0
PKgmiii	$K_{\mu 3}$	K mu three	not available
PKeiii	K_{e3}	K e three	not available
PKzS	K_S^0	K zero short	not available
PKzL	K_L^0	K zero long	not available
PKzgmiii	$K_{\mu 3}^0$	K zero mu three	not available
PKzeiii	K_{e3}^0	K zero e three	not available
PKst	$K^*(892)$	K star	not available
PKi	$K_1(1270)$	K one	K1(1270)
PKsta	$K^*(1370)$	K star (1370)	not available
PKia	$K_1(1400)$	K one (1400)	not available
PKstz	$K_0^*(1430)$	K star zero (1430)	not available
PKstii	$K_2^*(1430)$	K star two (1430)	not available
PKstb	$K^*(1680)$	K star (1680)	not available
PKii	$K_2(1770)$	K two (1770)	not available
PKstiii	$K_3^*(1780)$	K star three	not available
PKstiv	$K_4^*(2045)$	K star four	not available
Charmed Mesons (C=±1)			
PDpm	$D^{\pm}$	D plus/minus	D+-
PDm	D^-	D minus	D-
PDp	D^+	D plus	D+
PDz	D^0	D zero	D0
PaDz	$\overline{D}^0$	anti D zero	DBAR0
PDstpm	$D^*(2010)^{\pm}$	D star plus/minus	D*(2010)+-
PDstz	$D^*(2010)^0$	D star zero	D*(2010)0
PDiz	$D_1(2420)^0$	D one zero	D1(2420)0
PDstiiz	$D_2^*(2460)^0$	D star two zero	D2*(2460)0
Charmed Strange Mesons (C=S=±1)			
PsDp	D_s^+	D s plus	D/S+
PsDm	D_s^-	D s minus	D/S-
PsDst	D_s^*	D s star	D/S*
PsDipm	$D_{s1}(2536)^{\pm}$	D s one plus/minus	not available
Bottom Mesons (B=±1)			
PB	B	B	B

Table 3: PEN names (continued)

PEN	symbol	conventional name	computer name
PBp	B^+	B plus	B+
PBm	B^-	B minus	B-
PBpm	$B^\pm$	B plus/minus	B+-
PBz	B^0	B zero	B0
Pcgh	$\eta_c(1S)$	eta c	ETA/C(1S)
PJgy	$J/\psi(1S)$	J psi	J/PSI(1S)
Pcgcz	$\chi_{c0}(1P)$	chi c zero	CHI/C0(1P)
Pcgci	$\chi_{c1}(1P)$	chi c one	CHI/C1(1P)
Pcgcii	$\chi_{c2}(1P)$	chi c two	CHI/C2(1P)
Pgy	$\psi(2S)$	psi	PSI(2S)
Pgya	$\psi(3770)$	psi 3770	PSI(3770)
Pgyb	$\psi(4040)$	psi 4040	PSI(4040)
Pgyc	$\psi(4160)$	psi 4160	PSI(4160)
Pgyd	$\psi(4415)$	psi 4415	PSI(4415)
PgU	$\Upsilon(1S)$	Upsilon	not available
Pbgcz	$\chi_{b0}(1P)$	chi b zero	CHI/B0(1P)
Pbgci	$\chi_{b1}(1P)$	chi b one	CHI/B1(1P)
Pbgcii	$\chi_{b2}(1P)$	chi b two	CHI/B2(1P)
PgUa	$\Upsilon(2S)$	Upsilon (2S)	UPSI(2S)
Pbgcza	$\chi_{b0}(2P)$	chi b zero (2P)	CHI/B0(2P)
Pbgcia	$\chi_{b1}(2P)$	chi b one (2P)	CHI/B1(2P)
Pbgciia	$\chi_{b2}(2P)$	chi b two (2P)	CHI/B2(2P)
PgUb	$\Upsilon(3S)$	Upsilon (3S)	UPSI(3S)
PgUc	$\Upsilon(4S)$	Upsilon (4S)	UPSI(4S)
PgUd	$\Upsilon(10860)$	Upsilon (10860)	UPSI(10860)
PgUe	$\Upsilon(11020)$	Upsilon (11020)	UPSI(11020)
N Baryons (S=0, I=1/2)			
Pp	p	proton	P
Pn	n	neutron	N
PNa	$N(1440)P_{11}$	N (1440) P 11	N(1440P11)
PNb	$N(1520)D_{13}$	N (1520) D 13	not available
PNc	$N(1535)S_{11}$	N (1535) S 11	not available
PNd	$N(1650)S_{11}$	N (1650) S 11	not available
PNe	$N(1675)D_{15}$	N (1675) D 15	not available
PNf	$N(1680)F_{15}$	N (1680) F 15	not available
PNg	$N(1700)D_{13}$	N (1700) D 13	not available
PNh	$N(1710)P_{11}$	N (1710) P 11	not available
PNi	$N(1720)P_{13}$	N (1720) P 13	not available
PNj	$N(2190)G_{17}$	N (2190) G 17	not available
PNk	$N(2220)H_{19}$	N (2220) H 19	not available
PNl	$N(2250)G_{19}$	N (2250) G 19	not available
PNm	$N(2600)I_{1,11}$	N (2600) I 1,11	not available
Δ Baryons (S=0, I=3/2)			
PgDa	$\Delta(1232)P_{33}$	Delta (1232) P 33	DELTA(1232P33)
PgDb	$\Delta(1620)S_{31}$	Delta (1620) S 31	not available
PgDc	$\Delta(1700)D_{33}$	Delta (1700) D 33	not available
PgDd	$\Delta(1900)S_{31}$	Delta (1900) S 31	not available
PgDe	$\Delta(1905)F_{35}$	Delta (1905) F 35	not available
PgDf	$\Delta(1910)P_{31}$	Delta (1910) P 31	not available
PgDh	$\Delta(1920)P_{33}$	Delta (1920) P 33	not available
PgDi	$\Delta(1930)D_{35}$	Delta (1930) D 35	not available
PgDj	$\Delta(1950)F_{37}$	Delta (1950) F 37	not available
PgDk	$\Delta(2420)H_{3,11}$	Delta (2420) H 3,11	not available
Λ Baryons (S=$-$1, I=0)			
PgL	Λ	Lambda	LAMBDA
PgLa	$\Lambda(1405)S_{01}$	Lambda (1405) S 01	LAMBDA(1405S01)
PgLb	$\Lambda(1520)D_{03}$	Lambda (1520) D 03	LAMBDA(1520D03)
PgLc	$\Lambda(1600)P_{01}$	Lambda (1600) P 01	not available

Table 3: PEN names (continued)

PEN	symbol	conventional name	computer name
PgLd	$\Lambda(1670)S_{01}$	Lambda (1670) S 01	not available
PgLe	$\Lambda(1690)D_{03}$	Lambda (1690) D 03	not available
PgLf	$\Lambda(1800)S_{01}$	Lambda (1800) S 01	not available
PgLg	$\Lambda(1810)P_{01}$	Lambda (1810) P 01	not available
PgLh	$\Lambda(1820)F_{05}$	Lambda (1820) F 05	not available
PgLi	$\Lambda(1830)D_{05}$	Lambda (1830) D 05	not available
PgLj	$\Lambda(1890)P_{03}$	Lambda (1890) P 03	not available
PgLk	$\Lambda(2100)G_{07}$	Lambda (2100) G 07	not available
PgLl	$\Lambda(2110)F_{05}$	Lambda (2110) F 05	not available
PgLm	$\Lambda(2350)H_{09}$	Lambda (2350) H 09	not available
	Σ Baryons (S=−1, I=1)		
PgSp	Σ^+	Sigma plus	SIGMA+
PgSz	Σ^0	Sigma zero	SIGMA0
PgSm	Σ^-	Sigma minus	SIGMA-
PgSa	$\Sigma(1385)P_{13}$	Sigma (1385) P 13	not available
PgSb	$\Sigma(1660)P_{11}$	Sigma (1660) P 11	not available
PgSc	$\Sigma(1670)D_{13}$	Sigma (1670) D 13	not available
PgSd	$\Sigma(1750)S_{11}$	Sigma (1750) S 11	not available
PgSe	$\Sigma(1775)D_{15}$	Sigma (1775) D 15	not available
PgSf	$\Sigma(1915)F_{15}$	Sigma (1915) F 15	not available
PgSg	$\Sigma(1940)D_{13}$	Sigma (1940) D 13	not available
PgSh	$\Sigma(2030)F_{17}$	Sigma (2030) F 17	not available
PgSi	$\Sigma(2050)$	Sigma (2250)	not available
	Ξ Baryons (S=−2, I=1/2)		
PgXz	Ξ^0	Xi zero	XI0
PgXm	Ξ^-	Xi minus	XI-
PgXa	$\Xi(1530)P_{13}$	Xi (1530) P 13	not available
PgXb	$\Xi(1690)$	Xi (1690)	not available
PgXc	$\Xi(1820)D_{13}$	Xi (1820) D 13	not available
PgXd	$\Xi(1950)$	Xi (1950)	not available
PgXe	$\Xi(2030)$	Xi (2030)	not available
	Ω Baryons (S=−3, I=0)		
PgOm	Ω^-	Omega minus	OMEGA-
PgOma	$\Omega(2250)^-$	Omega (2250) minus	OMEGA(2250)-
	Charmed Baryons (C=+1)		
PcgLp	Λ_c^+	charmed Lambda plus	LAMBDA/C+
PcgXz	Ξ_c^0	charmed Xi zero	not available
PcgXp	Ξ_c^+	charmed Xi plus	not available
PcgS	$\Sigma_c(2455)$	charmed Sigma 2455	not available
	Supersymmetric Particles		
PSgg	$\tilde{\gamma}$	photino	PHOTINO
PSgxz	$\tilde{\chi}_i^0$	neutralino	NEUTRALINO
PSZz	$\tilde{Z}^0$	supersymmetric Z zero	ZINO
PSHz	$\tilde{H}_j^0$	Higgsino	HIGGSINO
PSgxpm	$\tilde{\chi}^{\pm_i}$	chargino	CHARGINO
PSWpm	$\tilde{W}^{\pm}$	supersymmetric W plus/minus	not available
PSHpm	$\tilde{H}^{\pm_j}$	charged Higgsino	not available
PSgn	$\tilde{\nu}$	scalar neutrino	not available
PSe	$\tilde{e}$	scalar electron	not available
PSgm	$\tilde{\mu}$	scalar muon	not available
PSgt	$\tilde{\tau}$	scalar tau	not available
PSq	$\tilde{q}$	scalar quark	not available
PSg	$\tilde{g}$	gluino	GLUINO