ATLAS Note

18th May 2021

Symbols defined in `atlasphysics.sty`

Ian C. Brock

University of Bonn

This note lists the symbols defined in `atlasphysics.sty`. These provide examples of how to define your own symbols, as well as many symbols that are often used in ATLAS documents.

This document was generated using version 11.3.0-alpha of the ATLAS LaTeX package. The TeX Live version is set to 2016. It uses the option atlasstyle, which implies that the standard ATLAS preprint style is used. The language is set to UKenglish.

Contents

1 `atlasphysics.sty` style file

The `atlasphysics.sty` style file implements a series of useful shortcuts to typeset a physics paper, such as particle symbols.

Options are parsed with the `kvoptions` package, which is included by default. The style file can included in the preamble of your paper with the usual syntax:

```
\usepackage{atlasphysics}
```

The file is actually split into smaller files, which can be included or not using options. The following options are available, where the default setting is given in parentheses:

BSM (false) BSM and SUSY particles.

hion (false) Useful macros for heavy ion physics.

jetetmiss (false) Useful macros for Jet/Etmiss publications.

journal (true) Journal abbreviations and a few other definitions for references.

math (false) A few extra maths definitions.

misc (true) Miscellaneous definitions that are often used.

other (false) Definitions that used to be in `atlasphysics.sty`, but are probably too specialised to be needed by most people.

particle (true) Standard Model particles and some combinations.

hepparticle (false) Standard Model particles and some combinations using the `hepparticle` package. This option will supersede particle at some time.

process (false) Some example processes. These are not included by default as the current choice is rather arbitrary and certainly not complete.

hepprocess (false) Some example processes using the `hepparticle` package. These are not included by default as the current choice is rather arbitrary and certainly not complete. This option will supersede process at some time.

unit (true) Units that used to be defined – not needed if you use `siunitx` or `hepunits`.

xref (true) Useful abbreviations for cross-references.

texlive=YYYY (2016) Set if you use an older version of TEX Live like 2013.

texmf (true) Use the syntax `\usepackage{package}` instead of `\usepackage{\ATLASLATEXPATH package}` to include packages. This is needed if you install `atlaslatex` centrally, rather than in a `latex` subdirectory.

Note that BSM and BSM=true are equivalent. Use the syntax option=false to turn off an option.

N: 10.0.0 `\ATLASLATEXPATH` is no longer used, so the option texmf has been set to true.

If the option texmf is included, the subfiles are included using the command: `\RequirePackage{atlasparticle}` etc. instead of `\RequirePackage{\ATLASLATEXPATH atlasparticle}`.

N: 10.0.0 This is now the default option.

All definitions are done in a consistent way using `\newcommand*`. All definitions use `\ensuremath` where appropriate and are terminated with `\xspace`, so you can simply write `\ttbar production` instead of `\ttbar\ production` or `\ttbar{} production` to get '$t\bar{t}$ production'.

The `hepparticles` [1] package has uniform definitions for many Standard Model and BSM particles. In fact you should use the package `heppennames` and/or `hepnicenames`, which contain many predefined particles. These packages load `hepparticles`, which can then be used to define more particles if you need them. One very nice feature of these packages is that you can switch between italic and upright symbols via an option.

See Section 17 for details on changes that were introduced when when going from version 00-04-05 of `atlasnote` to version 01-00-00 of `atlaslatex`. Let me know if you spot some other changes that are not documented here!

Changes to the contents that might affect existing documents are given in Section 16.

The following sections list the macros defined in the various files.

2 `atlasparticle.sty`

Turn on including these definitions with the option particle=true and off with the option particle=false.

As an alternative you can use the `heppparticles` [1] package, which has uniform definitions for many Standard Model and BSM particles.

Use the hepparticle=true instead of particle=true to use the `hepparticle` definitions.

`\pp`	pp
`\pbar`	$\bar{p}$
`\ppbar`	$p\bar{p}$
`\tbar`	$\bar{t}$
`\ttbar`	$t\bar{t}$
`\bbar`	$\bar{b}$
`\bbbar`	$b\bar{b}$
`\cbar`	$\bar{c}$
`\ccbar`	$c\bar{c}$
`\sbar`	$\bar{s}$
`\ssbar`	$s\bar{s}$
`\ubar`	$\bar{u}$
`\uubar`	$u\bar{u}$
`\dbar`	$\bar{d}$
`\ddbar`	$d\bar{d}$
`\fbar`	$\bar{f}$
`\ffbar`	$f\bar{f}$
`\qbar`	$\bar{q}$
`\qqbar`	$q\bar{q}$
`\nbar`	$\bar{\nu}$
`\nnbar`	$\nu\bar{\nu}$
`\ee`	e^+e^-
`\epm`	$e^\pm$
`\epem`	e^+e^-
`\mumu`	$\mu^+\mu^-$
`\tautau`	$\tau^+\tau^-$
`\leplep`	$\ell^+\ell^-$
`\ellell`	$\ell^+\ell^-$
`\enu`	$e\nu$
`\munu`	$\mu\nu$
`\lnu`	$\ell\nu$
`\taulep`	τ_{lep}
`\tauhad`	τ_{had}
`\tauhadvis`	$\tau_{\text{had-vis}}$
`\Zzero`	Z
`\Zboson`	Z
`\Wplus`	W^+
`\Wminus`	W^-
`\Wboson`	W
`\Wpm`	$W^\pm$
`\Wmp`	$W^\mp$
`\pizero`	π^0
`\piplus`	π^+
`\piminus`	π^-
`\pipm`	$\pi^\pm$
`\pimp`	$\pi^\mp$
`\etaprime`	η'
`\Kzero`	K^0
`\Kzerobar`	$\overline{K}^0$
`\kaon`	K
`\Kplus`	K^+
`\Kminus`	K^-
`\KzeroL`	K^0_L
`\Kzerol`	K^0_L
`\Klong`	K^0_L
`\KzeroS`	K^0_S
`\Kzeros`	K^0_S
`\Kshort`	K^0_S
`\Kstar`	K^*
`\jpsi`	J/ψ
`\Jpsi`	J/ψ
`\psip`	$\psi(2\text{S})$
`\chic`	χ_c
`\UoneS`	$\Upsilon(1\text{S})$
`\chib`	χ_b
`\Dstar`	D^*

\Bd	B_d^0
\Bs	B_s^0
\Bu	B_u
\Bc	B_c
\Lb	Λ_b
\Bstar	B^*
\BoBo	B^0–$\bar{B}^0$
\BodBod	B_d^0–$\bar{B}_d^0$
\BosBos	B_s^0–$\bar{B}_s^0$

Generic macros `\taup[1]` and `\Ups[1]` are available. They are defined such that `\taup{3}` produces $\tau_{\text{3-prong}}$ and `\Ups{3}` produces $\Upsilon(3S)$.

3 atlashepparticle.sty

Turn on including these definitions with the option hepparticle=true and off with the option hepparticle=false.

These definitions use the `hepparticles` [1] package, which has uniform definitions for many Standard Model and BSM particles. The names used are those in `heppennames`. The package loads `hepparticles`, which can then be used to define more particles if you need them. One very nice feature of these packages is that you can switch between italic and upright symbols via an option.

This version of the document uses the particle and process options and so does not show the definitions made using the hepparticle and hepprocess options.

Generic macros `\taup[1]` and `\Ups[1]` are available. They are defined such that `\taup{3}` produces $\tau_{\text{3-prong}}$ and `\Ups{3}` produces $\Upsilon(3S)$.

4 atlasjournal.sty

Turn on including these definitions with the option journal=true and off with the option journal=false.

`\AcPA`	Acta Phys. Austriaca
`\ARevNS`	Ann. Rev. Nucl. Sci.
`\CPC`	Comp. Phys. Comm.
`\EPJ`	Eur. Phys. J.
`\EPJC`	Eur. Phys. J. C
`\FortP`	Fortschr. Phys.
`\IJMP`	Int. J. Mod. Phys.
`\JETP`	Sov. Phys. JETP
`\JETPL`	JETP Lett.
`\JaFi`	Jad. Fiz.
`\JHEP`	JHEP
`\JMP`	J. Math. Phys.
`\MPL`	Mod. Phys. Lett.
`\NCim`	Nuovo Cimento
`\NIM`	Nucl. Instrum. Meth.
`\NIMA`	Nucl. Instrum. Meth. A
`\NP`	Nucl. Phys.
`\NPB`	Nucl. Phys. B
`\PL`	Phys. Lett.
`\PLB`	Phys. Lett. B
`\PR`	Phys. Rev.
`\PRC`	Phys. Rev. C
`\PRD`	Phys. Rev. D
`\PRL`	Phys. Rev. Lett.
`\PRep`	Phys. Rep.
`\RMP`	Rev. Mod. Phys.
`\ZfP`	Z. Phys.
`\collab`	Collaboration

5 atlasmisc.sty

Turn on including these definitions with the option misc=true and off with the option misc=false.

`\pT`	p_{T}
`\pt`	p_{T}
`\ET`	E_{T}
`\eT`	E_{T}
`\et`	E_{T}
`\HT`	H_{T}
`\pTsq`	p_{T}^{2}
`\MET`	$E_{\mathrm{T}}^{\mathrm{miss}}$
`\met`	$E_{\mathrm{T}}^{\mathrm{miss}}$
`\sumET`	$\sum E_{\mathrm{T}}$
`\EjetRec`	E_{rec}
`\PjetRec`	p_{rec}
`\EjetTru`	E_{true}
`\PjetTru`	p_{true}
`\EjetDM`	E_{DM}
`\Rcone`	R_{cone}
`\abseta`	$\lvert\eta\rvert$
`\Ecm`	E_{cm}
`\rts`	$\sqrt{s}$
`\sqs`	$\sqrt{s}$
`\Nevt`	N_{evt}
`\zvtx`	z_{vtx}
`\dzero`	d_0
`\zzsth`	$z_0 \sin(\theta)$
`\RunOne`	Run 1
`\RunTwo`	Run 2
`\RunThr`	Run 3
`\kt`	k_t
`\antikt`	anti-k_t
`\Antikt`	Anti-k_t
`\pileup`	pile-up
`\Pileup`	Pile-up
`\btag`	b-tagging

\btagged	b-tagged	\PROPHECY	PROPHECY4F
\bquark	b-quark	\PROTOS	PROTOS
\bquarks	b-quarks	\Pythia	PYTHIA
\bjet	b-jet	\PYTHIA	PYTHIA
\bjets	b-jets	\RECOLA	RECOLA
\mh	m_h	\Sherpa	SHERPA
\mW	m_W	\SHERPA	SHERPA
\mZ	m_Z	\TOPpp	TOP++
\mH	m_H	\VBFNLO	VBFNLO
\ACERMC	ACERMC	\MGNLOHER	MADGRAPH5_aMC@NLO+HERWIG
\ALPGEN	ALPGEN	\MGNLOPY	MADGRAPH5_aMC@NLO+PYTHIA
\AMCatNLO	aMC@NLO	\MGHER	MADGRAPH5+HERWIG
\BLACKHAT	BLACKHAT	\MGPY	MADGRAPH5+PYTHIA
\CALCHEP	CALCHEP	\POWHER	POWHEG+HERWIG
\COLLIER	COLLIER	\POWPY	POWHEG+PYTHIA
\COMPHEP	COMPHEP	\SHERPABH	SHERPA+BLACKHAT
\EVTGEN	EVTGEN	\SHERPAOL	SHERPA+OPENLOOPS
\FEYNRULES	FEYNRULES	\ABM	ABM
\GGTOVV	GG2VV	\ABKM	ABKM
\GOSAM	GOSAM	\CT	CT
\HATHOR	HATHOR	\CTEQ	CTEQ
\Herwig	HERWIG	\GJR	GJR
\HERWIG	HERWIG	\HERAPDF	HERAPDF
\HERWIGpp	HERWIG++	\LUXQED	LUXQED
\HRES	HRES	\MSTW	MSTW2008
\JIMMY	JIMMY	\MMHT	MMHT2014
\MADSPIN	MADSPIN	\MSHT	MSHT2020
\MADGRAPH	MADGRAPH	\NNPDF	NNPDF
\MGNLO	MADGRAPH5_aMC@NLO	\PDFforLHC	PDF4LHC
\MCatNLO	MC@NLO	\AUET	AUET2
\MCFM	MCFM	\AZNLO	AZNLO
\METOP	METOP	\FXFX	FXFX
\OPENLOOPS	OPENLOOPS	\GEANT	GEANT4
\POWHEG	POWHEG	\MENLOPS	MENLOPS
\POWHEGBOX	POWHEG BOX	\MEPSatLO	MEPS@LO
\POWHEGBOXRES	POWHEG BOX RES	\MEPSatNLO	MEPS@NLO
\PHOTOS	PHOTOS	\MINLO	MINLO
\PHOTOSpp	PHOTOS++	\Monash	Monash

`\Perugia`	Perugia
`\Prospino`	Prospino
`\UEEE`	UE-EE-5
`\LO`	LO
`\NLO`	NLO
`\NLL`	NLL
`\NNLO`	NNLO
`\muF`	μ_{f}
`\muQ`	μ_{q}
`\muR`	μ_{r}
`\hdamp`	h_{damp}
`\NLOEWvirt`	NLO $\mathrm{EW}_{\mathrm{virt}}$
`\ra`	$\rightarrow$
`\la`	$\leftarrow$
`\rarrow`	$\rightarrow$
`\larrow`	$\leftarrow$
`\lapprox`	$\lesssim$
`\rapprox`	$\gtrsim$
`\gam`	γ
`\stat`	(stat.)
`\syst`	(syst.)
`\radlength`	X_0
`\StoB`	S/B
`\alphas`	α_{s}
`\NF`	N_{F}
`\NC`	N_{C}
`\CF`	C_{F}
`\CA`	C_{A}
`\TF`	T_{F}
`\Lms`	$\Lambda_{\overline{\mathrm{MS}}}$
`\Lmsfive`	$\Lambda_{\overline{\mathrm{MS}}}^{(5)}$
`\kperp`	$k_{\perp}$
`\Vcb`	$\lvert V_{cb}\rvert$
`\Vub`	$\lvert V_{ub}\rvert$
`\Vtd`	$\lvert V_{td}\rvert$
`\Vts`	$\lvert V_{ts}\rvert$
`\Vtb`	$\lvert V_{tb}\rvert$
`\Vcs`	$\lvert V_{cs}\rvert$
`\Vud`	$\lvert V_{ud}\rvert$
`\Vus`	$\lvert V_{us}\rvert$
`\Vcd`	$\lvert V_{cd}\rvert$

A length `\figwidth` is defined that is 2 cm smaller than `\textwidth`.

Monte Carlo generators and PDFs have an optional argument that allows you to include the version, e.g. `\PYTHIA[8]` to produce PYTHIA 8 or `\PYTHIA[(v8.160)]` to produce PYTHIA (v8.160).

A generic macro `\twomass` is defined, so that for example `\twomass{\mu}{\mu}` produces $m_{\mu\mu}$ and `\twomass{\mu}{e}` produces $m_{\mu e}$.

A macro `\dk` is also defined which makes it easier to write down decay chains. For example

```
\[\eqalign{a \to & b+c\\
   & \dk & e+f \\
   && \dk g+h}
\]
```

produces

$$\begin{aligned} a &\rightarrow b + c \\ &\quad \lfloor\!\longrightarrow\ e + f \\ &\qquad\qquad \lfloor\!\longrightarrow\ g + h \end{aligned}$$

Note that `\eqalign` is also redefined in this package so that `\dk` works.

The following macro names have been changed: `\ptsq` $\rightarrow$ `\pTsq`.

6 atlasxref.sty

Turn on including these definitions with the option xref=true and off with the option xref=false.

The following macros with arguments are also defined:

\App{1}	Appendix 1
\Eqn{1}	Eq. 1
\Fig{1}	Figure 1
\Refn{1}	Ref. 1
\Sect{1}	Section 1
\Tab{1}	Table 1
\Apps{1}{4}	Appendices 1 and 4
\Eqns{1}{4}	Eqs. 1 and 4
\Figs{1}{4}	Figures 1 and 4
\Refns{1}{4}	Refs. 1 and 4
\Sects{1}{4}	Sections 1 and 4
\Tabs{1}{4}	Tables 1 and 4
\Apprange{1}{4}	Appendices 1–4
\Eqnrange{1}{4}	Eqs. 1–4
\Figrange{1}{4}	Figures 1–4
\Refrange{1}{4}	Refs. 1–4
\Sectrange{1}{4}	Sections 1–4
\Tabrange{1}{4}	Tables 1–4

The idea is that you can adapt these definitions according to your own preferences (or those of a journal). Note that the macros \Ref and \Refs were renamed to \Refn and \Refns in atlaslatex 08-00-00, as \Ref is now defined in the hyperref package.

7 atlasbsm.sty

Turn on including these definitions with the option BSM and off with the option BSM=false.

The macro \susy simply puts a tilde (˜) over its argument, e.g. \susy{q} produces $\tilde{q}$.

For $\tilde{q}$, $\tilde{t}$, $\tilde{b}$, $\tilde{\ell}$, $\tilde{e}$, $\tilde{\mu}$ and $\tilde{\tau}$, L and R states are defined; for stop, sbottom and stau also the light (1) and heavy (2) states. There are four neutralinos and two charginos defined, the index number unfortunately needs to be written out completely. For the charginos the last letter(s) indicate(s) the charge: ‘p’ for +, ‘m’ for −, and ‘pm’ for ±.

\Azero	A^0
\hzero	h^0
\Hzero	H^0
\Hboson	H
\Hplus	H^+
\Hminus	H^-
\Hpm	$H^\pm$
\Hmp	$H^\mp$
\ggino	$\tilde{\chi}$
\chinop	$\tilde{\chi}^+$
\chinom	$\tilde{\chi}^-$
\chinopm	$\tilde{\chi}^\pm$
\chinomp	$\tilde{\chi}^\mp$
\chinoonep	$\tilde{\chi}_1^+$
\chinoonem	$\tilde{\chi}_1^-$
\chinoonepm	$\tilde{\chi}_1^\pm$
\chinotwop	$\tilde{\chi}_2^+$
\chinotwom	$\tilde{\chi}_2^-$
\chinotwopm	$\tilde{\chi}_2^\pm$
\nino	$\tilde{\chi}^0$
\ninoone	$\tilde{\chi}_1^0$
\ninotwo	$\tilde{\chi}_2^0$
\ninothree	$\tilde{\chi}_3^0$
\ninofour	$\tilde{\chi}_4^0$
\gravino	$\tilde{G}$

`\Zprime`	Z'
`\Zstar`	Z^*
`\squark`	$\tilde{q}$
`\squarkL`	$\tilde{q}_\mathrm{L}$
`\squarkR`	$\tilde{q}_\mathrm{R}$
`\gluino`	$\tilde{g}$
`\stop`	$\tilde{t}$
`\stopone`	$\tilde{t}_1$
`\stoptwo`	$\tilde{t}_2$
`\stopL`	$\tilde{t}_\mathrm{L}$
`\stopR`	$\tilde{t}_\mathrm{R}$
`\sbottom`	$\tilde{b}$
`\sbottomone`	$\tilde{b}_1$
`\sbottomtwo`	$\tilde{b}_2$
`\sbottomL`	$\tilde{b}_\mathrm{L}$
`\sbottomR`	$\tilde{b}_\mathrm{R}$
`\slepton`	$\tilde{\ell}$
`\sleptonL`	$\tilde{\ell}_\mathrm{L}$
`\sleptonR`	$\tilde{\ell}_\mathrm{R}$
`\sel`	$\tilde{e}$
`\selL`	$\tilde{e}_\mathrm{L}$
`\selR`	$\tilde{e}_\mathrm{R}$
`\smu`	$\tilde{\mu}$
`\smuL`	$\tilde{\mu}_\mathrm{L}$
`\smuR`	$\tilde{\mu}_\mathrm{R}$
`\stau`	$\tilde{\tau}$
`\stauL`	$\tilde{\tau}_\mathrm{L}$
`\stauR`	$\tilde{\tau}_\mathrm{R}$
`\stauone`	$\tilde{\tau}_1$
`\stautwo`	$\tilde{\tau}_2$
`\snu`	$\tilde{\nu}$

8 `atlasheavyion.sty`

Turn on including these definitions with the option hion=true and off with the option hion=false. The heavy ion definitions use the package `mhchem` to help with the formatting of chemical elements. This package is included by `atlasheavyion.sty`.

`\NucNuc`	A+A
`\nn`	nn
`\pn`	pn
`\np`	np
`\PbPb`	Pb+Pb
`\AuAu`	Au+Au
`\CuCu`	Cu+Cu
`\pNuc`	p+A
`\pdA`	p/d+A
`\dAu`	d+Au
`\pPb`	p+Pb
`\Npart`	N_part
`\avgNpart`	$\langle N_\mathrm{part}\rangle$
`\Ncoll`	N_coll
`\avgNcoll`	$\langle N_\mathrm{coll}\rangle$
`\TA`	T_A
`\avgTA`	$\langle T_\mathrm{A}\rangle$
`\TPb`	T_Pb
`\avgTPb`	$\langle T_\mathrm{Pb}\rangle$
`\TAA`	T_AA
`\avgTAA`	$\langle T_\mathrm{AA}\rangle$
`\TAB`	T_AB
`\avgTAB`	$\langle T_\mathrm{AB}\rangle$
`\TpPb`	$T_{p\mathrm{Pb}}$
`\avgTpPb`	$\langle T_{p\mathrm{Pb}}\rangle$
`\Gl`	Glauber
`\GG`	Glauber–Gribov
`\sqn`	$\sqrt{s_\mathrm{NN}}$
`\lns`	$\ln(\sqrt{s})$
`\sumETPb`	$\Sigma E_\mathrm{T}^\mathrm{Pb}$
`\sumETp`	ΣE_T^{p}

`\sumETA`	$\Sigma E_{\mathrm{T}}^{\mathrm{A}}$
`\RAA`	R_{AA}
`\RCP`	R_{CP}
`\RpA`	$R_{p\mathrm{A}}$
`\RpPb`	$R_{p\mathrm{Pb}}$
`\dNchdeta`	$\mathrm{d}N_{\mathrm{ch}}/\mathrm{d}\eta$
`\dNevtdET`	$\mathrm{d}N_{\mathrm{evt}}/\mathrm{d}E_{\mathrm{T}}$
`\ystar`	y^{*}
`\ycms`	y_{CM}
`\ygappb`	$\Delta\eta_{\mathrm{gap}}^{\mathrm{Pb}}$
`\ygapp`	$\Delta\eta_{\mathrm{gap}}^{p}$
`\fgap`	f_{gap}

9 atlasjetetmiss.sty

Turn on including these definitions with the option jetetmiss=true and off with the option jetetmiss=false.

`\topo`	topo-cluster
`\Topo`	Topo-cluster
`\topos`	topo-clusters
`\Topos`	Topo-clusters
`\insitu`	in situ
`\Insitu`	In situ
`\LS`	LS
`\NLOjet`	NLOJET++
`\Fastjet`	FASTJET
`\TwoToTwo`	$2 \to 2$
`\largeR`	large-R
`\LargeR`	Large-R
`\akt`	anti-k_t
`\Akt`	Anti-k_t
`\AKT`	anti-k_t
`\AKTFat`	anti-k_t, $R = 1.0$
`\AKTPrune`	anti-k_t, $R = 1.0$ (pruned)
`\AKTFilt`	anti-k_t, $R = 1.0$ (filtered)
`\KTSix`	k_t, $R = 0.6$
`\ca`	Cambridge–Aachen
`\CamKt`	C/A
`\CASix`	C/A, $R = 0.6$
`\CAFat`	C/A, $R = 1.2$
`\CAPrune`	C/A, $R = 1.2$ (pruned)
`\CAFilt`	C/A, $R = 1.2$ (filtered)
`\htt`	HEPTopTagger
`\mcut`	m_{cut}
`\Nfilt`	N_{filt}
`\Rfilt`	R_{filt}
`\ymin`	y_{min}
`\fcut`	f_{cut}
`\Rsub`	R_{sub}

`\mufrac`	μ_{frac}
`\Rcut`	R_{cut}
`\zcut`	z_{cut}
`\ftile`	f_{Tile0}
`\fem`	f_{LAr3}
`\fpres`	f_{PS}
`\fhec`	f_{HEC0}
`\ffcal`	f_{FCal1}
`\central`	$0.3 \le \lvert\eta\rvert < 0.8$
`\ecap`	$2.1 \le \lvert\eta\rvert < 2.8$
`\forward`	$3.6 \le \lvert\eta\rvert < 4.5$
`\Npv`	N_{PV}
`\Nref`	$N_{\mathrm{PV}}^{\mathrm{ref}}$
`\Navg`	$\langle N_{\mathrm{PV}}\rangle$
`\avgmu`	$\langle\mu\rangle$
`\JES`	JES
`\JMS`	JMS
`\EMJES`	EM+JES
`\GCWJES`	GCW+JES
`\LCWJES`	LCW+JES
`\EM`	EM
`\GCW`	GCW
`\LCW`	LCW
`\GSL`	GSL
`\GS`	GS
`\MTF`	MTF
`\MPF`	MPF
`\Njet`	N_{jet}
`\njet`	N_{jet}
`\ETjet`	$E_{\mathrm{T}}^{\mathrm{jet}}$
`\etjet`	$E_{\mathrm{T}}^{\mathrm{jet}}$
`\pTavg`	$p_{\mathrm{T}}^{\mathrm{avg}}$
`\ptavg`	$p_{\mathrm{T}}^{\mathrm{avg}}$
`\pTjet`	$p_{\mathrm{T}}^{\mathrm{jet}}$
`\ptjet`	$p_{\mathrm{T}}^{\mathrm{jet}}$
`\pTcorr`	$p_{\mathrm{T}}^{\mathrm{corr}}$
`\ptcorr`	$p_{\mathrm{T}}^{\mathrm{corr}}$
`\pTjeti`	$p_{\mathrm{T},i}^{\mathrm{jet}}$
`\ptjeti`	$p_{\mathrm{T},i}^{\mathrm{jet}}$
`\pTrecoil`	$p_{\mathrm{T}}^{\mathrm{recoil}}$
`\ptrecoil`	$p_{\mathrm{T}}^{\mathrm{recoil}}$
`\pTleading`	$p_{\mathrm{T}}^{\mathrm{leading}}$
`\ptleading`	$p_{\mathrm{T}}^{\mathrm{leading}}$
`\pTjetEM`	$p_{\mathrm{T,\,EM}}^{\mathrm{jet}}$
`\ptjetEM`	$p_{\mathrm{T,\,EM}}^{\mathrm{jet}}$
`\pThat`	$\hat{p}_{\mathrm{T}}$
`\pthat`	$\hat{p}_{\mathrm{T}}$
`\pTprobe`	$p_{\mathrm{T}}^{\mathrm{probe}}$
`\ptprobe`	$p_{\mathrm{T}}^{\mathrm{probe}}$
`\pTref`	$p_{\mathrm{T}}^{\mathrm{ref}}$
`\ptref`	$p_{\mathrm{T}}^{\mathrm{ref}}$
`\pToff`	O
`\ptoff`	O
`\pToffjet`	O^{jet}
`\ptoffjet`	O^{jet}
`\pTZ`	p_{T}^{Z}
`\ptZ`	p_{T}^{Z}
`\pTtrue`	$p_{\mathrm{T}}^{\mathrm{true}}$
`\pttrue`	$p_{\mathrm{T}}^{\mathrm{true}}$
`\pTtruth`	$p_{\mathrm{T}}^{\mathrm{true}}$
`\pttruth`	$p_{\mathrm{T}}^{\mathrm{true}}$
`\pTreco`	$p_{\mathrm{T}}^{\mathrm{reco}}$
`\ptreco`	$p_{\mathrm{T}}^{\mathrm{reco}}$
`\pTtrk`	$p_{\mathrm{T}}^{\mathrm{track}}$
`\pttrk`	$p_{\mathrm{T}}^{\mathrm{track}}$
`\ptrk`	p^{track}
`\pTtrkjet`	$p_{\mathrm{T}}^{\mathrm{track\ jet}}$
`\pttrkjet`	$p_{\mathrm{T}}^{\mathrm{track\ jet}}$
`\ntrk`	n_{track}
`\EoverP`	E/p
`\Etrue`	E^{true}
`\Etruth`	E^{true}
`\Ecalo`	E^{jet}
`\EcaloEM`	$E_{\mathrm{EM}}^{\mathrm{jet}}$
`\asym`	$\mathcal{A}$
`\Response`	$\mathcal{R}$

\Rcalo	$\mathcal{R}^{\text{jet}}$
\Rcalom	$\mathcal{R}^{\text{jet}}_{m}$
\RcaloEM	$\mathcal{R}^{\text{jet}}_{\text{EM}}$
\RMPF	$\mathcal{R}_{\text{MPF}}$
\EcaloCALIB	E^{jet}
\RcaloCALIB	$\mathcal{R}^{\text{jet}}$
\EcaloEMJES	$E^{\text{jet}}_{\text{EM+JES}}$
\RcaloEMJES	$\mathcal{R}^{\text{jet}}_{\text{EM+JES}}$
\EcaloGCWJES	$E^{\text{jet}}_{\text{GCW+JES}}$
\RcaloGCWJES	$\mathcal{R}^{\text{jet}}_{\text{GCW+JES}}$
\EcaloLCWJES	$E^{\text{jet}}_{\text{LCW+JES}}$
\RcaloLCWJES	$\mathcal{R}^{\text{jet}}_{\text{LCW+JES}}$
\Rtrack	$\mathcal{R}^{\text{track jet}}$
\rtrk	r_{trk}
\Rtrk	R_{trk}
\rtrackjet	$r^{\text{calo / track jet}}$
\rtrackjetiso	$r^{\text{calo / track jet}}_{\text{iso}}$
\rtrackjetnoniso	$r^{\text{calo / track jet}}_{\text{non-iso}}$
\rtrackjetisoratio	$r^{\text{calo / track jet}}_{\text{non-iso/iso}}$
\gammajet	γ+jet
\deltaphijetgamma	$\Delta\phi_{\text{jet}-\gamma}$
\rapjet	y
\etajet	η
\phijet	ϕ
\etadet	η_{det}
\etatrk	η^{track}
\Rmin	R_{min}
\DeltaR	ΔR
\DetaDphi	$\sqrt{(\Delta\eta)^2 + (\Delta\phi)^2}$
\Deta	$\lvert\Delta\eta\rvert$
\Drap	$\lvert\Delta y\rvert$
\DetaOneTwo	$\lvert\Delta\eta(\text{jet1}, \text{jet2})\rvert$
\DyDphi	$\sqrt{(\Delta y)^2 + (\Delta\phi)^2}$
\DeltaRdef	$\Delta R = \sqrt{(\Delta\eta)^2 + (\Delta\phi)^2}$
\DeltaRydef	$\Delta R = \sqrt{(\Delta y)^2 + (\Delta\phi)^2}$
\DeltaRtrk	$\Delta R(\text{trk}_1, \text{trk}_2)$
\JVF	JVF
\cJVF	corrJVF
\RpT	$R_{p_{\text{T}}}$
\JVT	JVT
\ghostpt	g_t
\ghostptavg	$\langle g_t \rangle$
\ghostfm	g_μ
\ghostfmi	$g_{\mu,i}$
\ghostdensity	ν_g
\ghostrho	$\nu_g \langle g_t \rangle$
\Aghost	A_g
\Amu	A_μ
\Amui	$A_{\mu,i}$
\jetarea	A^{jet}
\jetareafm	A^{jet}_{μ}
\jetareai	A^{jet}_{i}
\Rkt	R_{k_t}
\pTmuslope	$\partial\langle\Delta p_{\text{T}}\rangle/\partial\langle\mu\rangle$
\ptmuslope	$\partial\langle\Delta p_{\text{T}}\rangle/\partial\langle\mu\rangle$
\pTnpvslope	$\partial\langle\Delta p_{\text{T}}\rangle/\partial N_{\text{PV}}$
\ptnpvslope	$\partial\langle\Delta p_{\text{T}}\rangle/\partial N_{\text{PV}}$
\pTmuunc	$\Delta\left(\partial\langle\Delta p_{\text{T}}\rangle/\partial\langle\mu\rangle\right)$
\ptmuunc	$\Delta\left(\partial\langle\Delta p_{\text{T}}\rangle/\partial\langle\mu\rangle\right)$
\pTnpvunc	$\Delta\left(\partial\langle\Delta p_{\text{T}}\rangle/\partial N_{\text{PV}}\right)$
\ptnpvunc	$\Delta\left(\partial\langle\Delta p_{\text{T}}\rangle/\partial N_{\text{PV}}\right)$
\sumPt	$\sum \vec{p}_{\text{T}}$
\sumpt	$\sum \vec{p}_{\text{T}}$
\sumpTtrk	$\sum p_{\text{T}}^{\text{track}}$
\sumpttrk	$\sum p_{\text{T}}^{\text{track}}$
\nPUtrk	$n_{\text{trk}}^{\text{PU}}$
\mjet	m^{jet}
\mlead	m^{jet}_{1}
\mleadavg	$\langle m^{\text{jet}}_{1} \rangle$
\Mjet	m^{jet}
\massjet	m^{jet}
\masscorr	m^{corr}
\mthresh	$M_{\text{threshold}}$
\mjetavg	$\langle m^{\text{jet}} \rangle$
\masstrkjet	$m^{\text{track jet}}$
\width	w

`\wcalo`	w^{calo}
`\wtrk`	w^{track}
`\shapeV`	$\mathcal{V}$
`\pTsubjet`	$p_{\text{T}}^{\text{subjet}}$
`\ptsubjet`	$p_{\text{T}}^{\text{subjet}}$
`\sjone`	j_1
`\sjtwo`	j_2
`\msubjone`	m^{j_1}
`\msubjtwo`	m^{j_2}
`\pTsubji`	p_{T}^{i}
`\ptsubji`	p_{T}^{i}
`\pTsubjone`	$p_{\text{T}}^{j_1}$
`\ptsubjone`	$p_{\text{T}}^{j_1}$
`\pTsubjtwo`	$p_{\text{T}}^{j_2}$
`\ptsubjtwo`	$p_{\text{T}}^{j_2}$
`\Rsubjets`	R_{j_1,j_2}
`\DRsubjets`	$\Delta R_{j_1,j_2}$
`\yij`	y_{ij}
`\dcut`	d_{cut}
`\dmin`	d_{min}
`\dij`	d_{ij}
`\Dij`	$\sqrt{d_{ij}}$
`\Donetwo`	$\sqrt{d_{12}}$
`\Dtwothr`	$\sqrt{d_{23}}$
`\yonetwo`	y_1
`\ytwothr`	y_2
`\yonetwoDef`	$y_1 = \sqrt{d_{12}}/m^{\text{jet}}$
`\ytwothrDef`	$y_2 = \sqrt{d_{23}}/m^{\text{jet}}$
`\xj`	x_J
`\jetFunc`	$J^{(eik),c}(m^{\text{jet}}, p_{\text{T}}, R)$
`\tauone`	τ_1
`\tautwo`	τ_2
`\tauthr`	τ_3
`\tauN`	τ_N
`\tautwoone`	τ_{21}
`\tauthrtwo`	τ_{32}
`\dip`	$\mathcal{D}$
`\diponetwo`	$\mathcal{D}_{12}$
`\diptwothr`	$\mathcal{D}_{23}$
`\diponethr`	$\mathcal{D}_{13}$
`\mtaSup`	m^{TA}
`\mcalo`	m^{calo}
`\mcomb`	m^{comb}
`\ECFOne`	ECF_1
`\ECFTwo`	ECF_2
`\ECFThr`	ECF_3
`\ECFThrNorm`	e_3
`\DTwo`	D_2
`\CTwo`	C_2
`\FoxWolfRatio`	R_2^{FW}
`\PlanarFlow`	$\mathcal{P}$
`\Angularity`	a_3
`\Aplanarity`	A
`\KtDR`	$KtDR$
`\Qw`	Q_w
`\NConst`	N^{const}

The macro `\etaRange` produces what you would expect: `\etaRange{-2.5}{+2.5}` produces $-2.5 \leq |\eta| < +2.5$ while `\AetaRange{1.0}` produces $|\eta| < 1.0$. The macro `\avg` can be used for average values: `\avg{\mu}` produces $\langle\mu\rangle$.

10 atlasmath.sty

Turn on including these definitions with the option math=true and off with the option math=false.

\boxsq	$\Box^2$
\grad	$\boldsymbol{\nabla}$

The macro \spinor is also defined. \spinor{u} produces $\begin{pmatrix} u_1 \\ u_2 \\ u_3 \\ u_4 \end{pmatrix}$.

11 atlasother.sty

Turn on including these definitions with the option other and off with the option other=false.

\etpt	$1/p_{\mathrm{T}} - 1/E_{\mathrm{T}}$
\etptsig	$(1/p_{\mathrm{T}} - 1/E_{\mathrm{T}})/(\sigma(1/p_{\mathrm{T}}))$
\begL	$10^{31}\ \mathrm{cm}^{-2}\ \mathrm{s}^{-1}$
\lowL	$10^{33}\ \mathrm{cm}^{-2}\ \mathrm{s}^{-1}$
\highL	$10^{34}\ \mathrm{cm}^{-2}\ \mathrm{s}^{-1}$
\Epsb	ϵ_b
\Epsc	ϵ_c
\Mtau	m_τ
\swsq	$\sin^2\theta_{\mathrm{W}}$
\swel	$\sin^2\theta^{\mathrm{lept}}_{\mathrm{eff}}$
\swsqb	$\sin^2\overline{\theta}_{\mathrm{W}}$
\swsqon	$\sin^2\theta_{\mathrm{W}} \equiv 1 - m^2_W/m^2_Z$
\gv	g_{V}
\ga	g_{A}
\gvbar	$\bar{g}_{\mathrm{V}}$
\gabar	$\bar{g}_{\mathrm{A}}$
\Zzv	Z^*
\Abb	$A_{b\bar{b}}$
\Acc	$A_{c\bar{c}}$
\Aqq	$A_{q\bar{q}}$
\Afb	A_{FB}
\GZ	Γ_Z
\GW	Γ_W
\GH	Γ_H
\GamHad	Γ_{had}
\Gbb	$\Gamma_{b\bar{b}}$
\Rbb	$R_{b\bar{b}}$
\Gcc	$\Gamma_{c\bar{c}}$
\Gvis	Γ_{vis}
\Ginv	Γ_{inv}

12 atlasprocess.sty

Turn on including these definitions with the option process and off with the option process=false.

As an alternative you can use the hepparticles [1] package, which has uniform definitions for many Standard Model and BSM particles. Use the hepprocess=true instead of process=true to use the hepparticle definitions.

\btol	$b \to \ell$
\ctol	$c \to \ell$
\btoctol	$b \to c \to \ell$
\Jee	$J/\psi \to e^+e^-$
\Jmm	$J/\psi \to \mu^+\mu^-$
\Jmumu	$J/\psi \to \mu^+\mu^-$
\Wjj	$W \to jj$
\tjjb	$t \to jjb$
\Hbb	$H \to b\bar{b}$
\Hgg	$H \to \gamma\gamma$
\Hll	$H \to \ell\ell$
\Hllll	$H \to \ell\ell\ell\ell$
\Hmmmm	$H \to \mu\mu\mu\mu$
\Heeee	$H \to eeee$
\Zll	$Z \to \ell\ell$
\Zlplm	$Z \to \ell^+\ell^-$
\Zee	$Z \to ee$
\Zepem	$Z \to e^+e^-$
\Zmm	$Z \to \mu\mu$
\Zmpmm	$Z \to \mu^+\mu^-$
\Ztt	$Z \to \tau\tau$
\Ztptm	$Z \to \tau^+\tau^-$
\Zbb	$Z \to b\bar{b}$
\Wln	$W \to \ell\nu$
\Wen	$W \to e\nu$
\Wmn	$W \to \mu\nu$
\Wlnu	$W \to \ell\nu$
\Wenu	$W \to e\nu$
\Wmunu	$W \to \mu\nu$
\Wqqbar	$W \to q\bar{q}$
\Amm	$A \to \mu\mu$
\Ztautau	$Z \to \tau\tau$
\Wtaunu	$W \to \tau\nu$
\Atautau	$A \to \tau\tau$
\Htautau	$H \to \tau\tau$
\tWb	$t \to Wb$
\Wjets	$W+$jets
\Zjets	$Z+$jets
\Brjl	$\mathcal{B}(J/\psi \to \ell^+\ell^-)$

13 atlashepprocess.sty

Turn on including these definitions with the option hepprocess and off with the option hepprocess=false.

The packages heppennames and/or hepnicenames contain many predefined particles, so you do not need to define them yourself. These packages load hepparticles, which can then be used to define more particles if you need them. One very nice feature of these packages is that you can switch between italic and upright symbols via an option.

This version of the document uses the particle and process options and so does not show the definitions made using the hepparticle and hepprocess options.

14 atlassnippets.sty

Turn on including these definitions with the option snippets and off with the option snippets=false.

`\AntiktSnippet`	The anti-k_t algorithm with a radius parameter of $R = 0.4$ is used to reconstruct jets with a four-momentum recombination scheme, using topo-clustersas inputs. Jet energy is calibrated to the hadronic scale with the effect of pile-up removed.
`\TopoclusteringSnippet`	Hadronic jets are reconstructed from calibrated three-dimensional topo-clusters. Clusters are constructed from calorimeter cells that are grouped together using a topological clustering algorithm. These objects provide a three-dimensional representation of energy depositions in the calorimeter and implement a nearest-neighbour noise suppression algorithm. The resulting topo-clustersare classified as either electromagnetic or hadronic based on their shape, depth and energy density. Energy corrections are then applied to the clusters in order to calibrate them to the appropriate energy scale for their classification. These corrections are collectively referred to as *local cluster weighting*, or LCW, and jets that are calibrated using this procedure are referred to as LCW jets [2].
`\GroomingSnippet`	Trimming removes subjets with $p_{\mathrm{T}}^{i}/p_{\mathrm{T}}^{\mathrm{jet}} < f_{\mathrm{cut}}$, where p_{T}^{i} is the transverse momentum of the i^{th} subjet, and $f_{\mathrm{cut}} = 0.05$. Filtering proceeds similarly, but utilises the relative masses of the subjets defined and the original jet. For at least one of the configurations tested, trimming and filtering are both able to approximately eliminate the pile-up dependence of the jet mass.
`\FastSimSnippet`	The signal Monte Carlo samples were processed with a fast simulation that relies on a parameterisation of the calorimeter response [3].
`\PileupSnippet`	The generation of the simulated event samples includes the effect of multiple pp interactions per bunch crossing, as well as the effect on the detector response due to interactions from bunch crossings before or after the one containing the hard interaction.

15 atlasunit.sty

Turn on including these definitions with the option unit and off with the option unit=false.

\TeV	TeV
\GeV	GeV
\MeV	MeV
\keV	keV
\eV	eV
\TeVc	TeV/c
\GeVc	GeV/c
\MeVc	MeV/c
\keVc	keV/c
\eVc	eV/c
\TeVcc	TeV/c^2
\GeVcc	GeV/c^2
\MeVcc	MeV/c^2
\keVcc	keV/c^2
\eVcc	eV/c^2
\ifb	fb^{-1}
\ipb	pb^{-1}
\inb	nb^{-1}
\degr	°

Lower case versions of the units also exist, e.g. \tev, \gev, \mev, \kev, and \ev.

As mentioned above, it is highly recommended to use a units package instead of these definitions. siunitx is the preferred package; a good alternative is hepunits. If either of these packages are used atlasunit.sty is not needed.

Most units that are needed in ATLAS documents are already defined by siunitx or are defined in atlaspackage.sty. A selection of them is given below. In order to use them in your document the unit should be included in \si or \SI:

\si{\TeV}	TeV
\si{\GeV}	GeV
\si{\MeV}	MeV
\si{\keV}	keV
\si{\eV}	eV
\si{\TeVc}	TeV/c
\si{\GeVc}	GeV/c
\si{\MeVc}	MeV/c
\si{\keVc}	keV/c
\si{\eVc}	eV/c
\si{\TeVcc}	TeV/c^2
\si{\GeVcc}	GeV/c^2
\si{\MeVcc}	MeV/c^2
\si{\keVcc}	keV/c^2
\si{\eVcc}	eV/c^2
\si{\nb}	nb
\si{\pb}	pb
\si{\fb}	fb
\si{\per\fb}	fb^{-1}
\si{\per\pb}	pb^{-1}
\si{\per\nb}	nb^{-1}
\si{\ifb}	fb^{-1}
\si{\ipb}	pb^{-1}
\si{\inb}	nb^{-1}
\si{\Hz}	Hz
\si{\kHz}	kHz
\si{\MHz}	MHz
\si{\GHz}	GHz
\si{\degr}	°
\si{\m}	m
\si{\cm}	cm
\si{\mm}	mm
\si{\um}	µm
\si{\micron}	µm

16 Changes

Version 05-08-00 of atlaslatex includes a new atlassnippets.sty style file. This is supposed to contain snippets of text that are useful in many papers and/or notes.

Version 01-08-01 of atlaslatex includes quite a few definitions from the Jet/Etmiss group. A new style file has been created atlasjetetmiss.sty that is not included by default. Some of the definitions from the Jet/ETmiss group are of more general use and so have been merged into existing style files:

atlasmisc.sty List of Monte Carlo generators expanded: \POWHEGBOX, \POWPYTHIA. Add MC macros with suffix 'V' for version number. \kt, \antikt, \Antikt, \LO, \NLO, \NLL, \NNLO, \muF, \muR. Added macros \Runone, \Runtwo, \Runthr, Added \radlength and \StoB. Added some standard b-tagging terms: \btag, \btagged, \bquark, \bquarks, \bjet, \bjets.

atlasparticle.sty Now includes \pp, \enu, \munu,

atlasprocess.sty Added \Zbb, \Ztt, \Zlplm, \Zepem, \Zmpmm, \Ztptm, \tWb, \Wqqbar, \Wlnu, \Wenu, \Wmunu, \Wjets, \Zjets. The definition of \Hllll was corrected.

atlasheavyion.sty \pp moved to atlasparticle.sty.

This version also introduced the (optional) use of the heppennames package. The style files atlashepparticle.sty and atlashepprocess.sty are intended to replace atlasparticle.sty and atlasprocess.sty. Several particle definitions were removed from the atlasparticle package, as they just enable a few Greek letters: π, η and ψ to be used directly in text mode. In addition, the primed Υ resonances, e.g. Υ'', as well as D^{**} were removed. as the official names are $\varUpsilon(3S)$ etc.,

The definitions of MeV, GeV etc. in atlasunit.sty were updated in order to remove the if tests in them. The if tests caused a problem in a paper draft, although the reason was not understood. The new definitions do not introduce extra space before the unit in math mode.

17 Old macros

With the introduction of atlaslatex several macro names have been changed to make them more consistent. A few have been removed. The changes include:

- Kaons now have a capital 'K' in the macro name, e.g. \Kplus for K^+;
- \Ztau, \Wtau, \Htau \Atau have been replaced by \Ztautau, \Wtautau, \Htautau \Atautau;
- \Ups replaces \ups; the use of \ups to produce Υ in text mode has been removed;
- \cm has been removed, as it was the only length unit defined for text and math mode;
- \mass has been removed, as \twomass can do the same thing and the name is more intuitive;
- \mA has been removed as it conflicts with siunitx Version 1, which uses the name for milliamp.
- \mathcal rather than \mathscr is recommended for luminosity and aplanarity.

Quite a few macros are more related to Z physics than they are to LHC physics and have been moved to the `atlasother.sty` file, which is not included by default. There are also macros for various decay processes, `atlasprocess.sty` which are not included by default, but may be useful for how you can define your favourite process.

It used to be the case that you had to use `\MET{}` rather than just `\MET` to get the spacing right, as somehow `xspace` did not do a good job for $E_{\mathrm{T}}^{\mathrm{miss}}$. However, with the latest version of the packages both forms work fine. You can compare $E_{\mathrm{T}}^{\mathrm{miss}}$ and $E_{\mathrm{T}}^{\mathrm{miss}}$ and see that the spacing is correct in both cases.

References

[1] A. Buckley, *The* `hepparticles` *package for LaTeX*,
URL: https://www.ctan.org/pkg/hepparticles.

[2] ATLAS Collaboration, *Jet energy measurement and its systematic uncertainty in proton–proton collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector*, Eur. Phys. J. C **75** (2015) 17,
arXiv: 1406.0076 [hep-ex].

[3] ATLAS Collaboration, *The ATLAS Simulation Infrastructure*, Eur. Phys. J. C **70** (2010) 823,
arXiv: 1005.4568 [physics.ins-det].