ATLAS Note

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Guide to formatting tables for ATLAS documents

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This document illustrates the preferred style for tables in ATLAS documents. It illustrates what the tables should look like and also provides guidelines on how to achieve this look.

This document was generated using version 10.1.0 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.

1 General guidelines

Tables should only contain as many lines as are needed for clarity. Table 1 shows a good example that has been taken from 'Rounding — ATLAS Recommendations' [1].

An example of a wider and somewhat more complicated table is shown in Table 2.

A typical table containing Monte Carlo samples is given in Table 3.

Table 4 shows the use of ± as the intercolumn character for alignment. An alternative, as shown in Table 5, is to use `\phantom` to put in extra space equal to the width of a number if you have different numbers of decimal places in the table.

The `booktabs` package provides the macros `\toprule`, `\midrule`, `\bottomrule` which are to be preferred over `\hline`, as, among other things, they introduce some extra spacing around the lines, which is useful.

The `siunitx` package contains powerful macros for formatting tables and is highly recommended.

2 LaTeX packages for tables

The LaTeX package `booktabs` gives a number of guidelines on how tables should be formatted. These are followed to a large extent in this document. The following packages related to tables are included by default when you load the package `atlaspackage`:

booktabs useful tools for formatting tables;

siunitx tools for rounding and also for helping to format and align numbers in tables;

Further packages related to the formatting of tables are:

xtab the most modern package for tables that spread over more than one page;

longtable an alternative package for long tables;

supertabular yet another alternative package for long tables;

dcolumn can be used as an alternative to `siunitx` to align numbers in tables.

`xtab` is included if you load `atlaspackage` with the option full. You may also need to rotate a big table. The `rotating` package can be used for this.

In order to shorten commands when doing rounding in tables, it is useful to define a few extra macros. Typical definitions can be found in the file `../atlas_doc-defs.sty`.

If you use `siunitx` to format your numbers, you may have to adjust the option group-minimum-digits.

N: 04-00-00 The default value of group-minimum-digits is set to 5. Hence 1234 will not have a space after the thousands digit, whereas 12 345 will have. This is fine in text, but in tables, you probably want to use the option `\siseteup{group-minimum-digits=4}`, see Tables 7(a) to 7(b).

```
\sisetup{group-minimum-digits=4}
\caption{Example event yields spread over several orders of magnitude.}%
\label{tab:yield:2dig}
\centering
  \begin{tabular}{%
    l
    r@{\(\,\pm\,\)}r
  }
  \toprule
  {Channel} & \multicolumn{2}{c}{Selected events} \\
  \midrule
  \(WW, WZ, ZZ\)               & \numRF{943.045}{3}  & \numRF{94.3045}{2} \\
  QCD multijets                & \numRF{2838.39}{2}  & \numRF{1419.19}{2} \\
  \(Wc\bar{c}, Wb\bar{b}, Wc\) & \numRF{31178  }{2}  & \numRF{13094.8}{2} \\
  \(W\) + jets                 & \numRF{10584.5}{3}  & \numRF{4445.49}{2} \\
  Single top \(Wt\)            & \numRF{1699.75}{3}  & \numRF{152.977}{2} \\
  \(Z\) + jets                 & \numRF{2378.42}{2}  & \numRF{998.934}{2} \\
  Single top \(s\)             & \numRF{297.591}{3}  & \numRF{12.4988}{2} \\
  Single top \(t\)             & \numRF{3936.98}{3}  & \numRF{165.353}{2} \\
  \(t\bar{t}\)                 & \numRF{9386.28}{3}  & \numRF{901.083}{2} \\
  \midrule
  Expected                     & \numRF{63243}{2}    & \numRF{13968.5}{2} \\
  Data                         & \multicolumn{2}{l}{\num{73062}} \\
  \bottomrule
\end{tabular}
```

Table 1: Example event yields spread over several orders of magnitude.

Channel	Selected events
WW, WZ, ZZ	943 ± 94
QCD multijets	$2\,800 \pm 1\,400$
$Wc\bar{c}, Wb\bar{b}, Wc$	$31\,000 \pm 13\,000$
W + jets	$10\,600 \pm 4\,400$
Single top Wt	$1\,700 \pm 150$
Z + jets	$2\,400 \pm 1\,000$
Single top s	298 ± 12
Single top t	$3\,940 \pm 170$
$t\bar{t}$	$9\,390 \pm 900$
Expected	$63\,000 \pm 14\,000$
Data	73 062

```
\caption[Present FCNC top quark decays experimental limits]{Present
  experimental limits at \SI{95}{\%} confidence level
on the branching fractions of the FCNC top quark decay channels established by
  experiments of the LEP, HERA, Tevatron and LHC accelerators.}%
\label{tab:intro:presentlimits}
\centering
\begin{tabular}{lllll}
  \toprule
  Coupling & \multicolumn{2}{c}{LEP} & \multicolumn{2}{c}{HERA} \\
  \midrule
  \(\BR(t\to q\gamma)\) & \num{2.4E-2} &                          & \num{6.4E-3}
  & (\(tu\gamma\))\\
  \(\BR(t\to qZ)\)      & \num{7.8E-2} &                          & \num{49E-2} &
  (\(tuZ\))\\
  \(\BR(t\to qg)\)      & \num{17E-2}  &                          & \num{13E-2} &
  \\
  \bottomrule
  Coupling & \multicolumn{2}{c}{Tevatron}                    &
  \multicolumn{2}{c}{LHC} \\
  \midrule
  \(\BR(t\to q\gamma)\) & \num{3.2E-2} &                          &
  \multicolumn{1}{c}{---} \\
  \(\BR(t\to qZ)\)      & \num{3.2E-2} &                          & \num{7.0E-4}\\
  \(\BR(t\to qg)\)      & \num{2.0E-4} & (\(tug\)), \((2 \to 2)\)  &
  \multicolumn{1}{c}{---} \\
                        & \num{3.9E-3} & (\(tcg\)), \((2 \to 2)\)  &
  \multicolumn{1}{c}{---} \\
                        & \num{3.9E-4} & (\(tug\)), \((2 \to 1)\)  &
  \num{5.7E-5} & (\(tug\)), \((2 \to 1)\)\\
                        & \num{5.7E-3} & (\(tcg\)), \((2 \to 1)\)  &
  \num{2.7E-4} & (\(tcg\)), \((2 \to 1)\)\\
  \bottomrule
\end{tabular}
```

Table 2: Present experimental limits at 95% confidence level on the branching fractions of the FCNC top quark decay channels established by experiments of the LEP, HERA, Tevatron and LHC accelerators.

Coupling	LEP		HERA	
$\mathcal{B}(t \to q\gamma)$	2.4×10^{-2}		6.4×10^{-3}	$(tu\gamma)$
$\mathcal{B}(t \to qZ)$	7.8×10^{-2}		49×10^{-2}	(tuZ)
$\mathcal{B}(t \to qg)$	17×10^{-2}		13×10^{-2}	
Coupling	Tevatron		LHC	
$\mathcal{B}(t \to q\gamma)$	3.2×10^{-2}		—	
$\mathcal{B}(t \to qZ)$	3.2×10^{-2}		7.0×10^{-4}	
$\mathcal{B}(t \to qg)$	2.0×10^{-4}	(tug), $(2 \to 2)$	—	
	3.9×10^{-3}	(tcg), $(2 \to 2)$	—	
	3.9×10^{-4}	(tug), $(2 \to 1)$	5.7×10^{-5}	(tug), $(2 \to 1)$
	5.7×10^{-3}	(tcg), $(2 \to 1)$	2.7×10^{-4}	(tcg), $(2 \to 1)$

```
\caption{Top quark event MC samples used for this analysis. The cross-section
  column includes \(k\)-factors and branching ratios.}%
\label{tab:mcsamples}
\centering
\renewcommand{\arraystretch}{1.2}
\scriptsize
\begin{tabular}{lSlS[table-format=9.0]SS[table-format=6.0]}
  \toprule
    & {\(\sigma\) [\si{\pb}]} & Generator
    & \multicolumn{1}{c}{\(N_{MC}\)} & \multicolumn{1}{c}{\(k\)-factor} &
  \multicolumn{1}{c}{Dataset ID}\\
  \midrule
  \(Wt\) all decays                    &  22  & \POWHEG + \PYTHIA &   1000000
  & 1.09 & 110140\\
  \(t\)-channel (lepton+jets) top      &  18  & \POWHEG + \PYTHIA &   5000000
  & 1.05 & 110090\\
  \(s\)-channel (lepton+jets) antitop &  1.8 & \POWHEG + \PYTHIA &   5000000
  & 1.06 & 110091\\
  \(t\bar{t}\) no fully hadronic       & 114  & \POWHEG + \PYTHIA & 100000000
  & 1.12 & 117050\\
  \bottomrule
\end{tabular}
```

Table 3: Top quark event MC samples used for this analysis. The cross-section column includes k-factors and branching ratios.

	σ [pb]	Generator	N_{MC}	k-factor	Dataset ID
Wt all decays	22	POWHEG + PYTHIA	1 000 000	1.09	110 140
t-channel (lepton+jets) top	18	POWHEG + PYTHIA	5 000 000	1.05	110 090
s-channel (lepton+jets) antitop	1.8	POWHEG + PYTHIA	5 000 000	1.06	110 091
$t\bar{t}$ no fully hadronic	114	POWHEG + PYTHIA	100 000 000	1.12	117 050

3 Tables and rounding

Further examples of tables can be found in the note discussing the ATLAS recommendation on rounding [1]. A selection of those tables are also reproduced here. The LaTeX code for the examples given below can be found in Appendix A.

The tables shown earlier in this document were also created with `siunitx`. A few more examples of how to steer the formatting are given here. Table 7 compares two different approaches to how this can be done in `siunitx`, even for asymmetric errors. Note that although these tables look almost identical, the syntax used to create them is different (see Appendix A). While the form may appear to be a bit clumsy at first, it is easy enough to get a program to write out the lines. In the left-hand table `\numRP` is used in column 3, while the full syntax of `\num` in shown in column 4 for illustration purposes only. The syntax to change the precision of a single number is shown in the first line of the left-hand part of the table. This is seen to be rather trivial, but the alignment on the decimal point is now no longer perfect. While this is probably OK for internal notes etc., papers (should) have more stringent requirements. Another way of achieving the

```
\caption[Monte Carlo purities in the single lepton sample]{%
  Monte Carlo estimates of the fraction of each process in the single
  lepton data sample. This table uses ``S'' format from \texttt{siunitx} and
  ``\texttt{\(\,\pm\,\)}'' as the intercolumn separator.}%
\label{tab:example1}
\centering
\begin{tabular}{l S[table-format=2.1]@{\(\;\pm\;\)}S[table-format=1.1]@{\,}s
  S[table-format=3.1]@{\,}s}
  \toprule
  Category             &
  \multicolumn{3}{c}{\(\mu\)}&\multicolumn{2}{c}{\(e\)}\\
  \midrule
  \(b \to \ell\)       &     65.2 & 0.4 & \%   &  79.3 & \% \\
  \(b \to c \to \ell\) &      7.8 & 0.3 & \%   &   5.4 & \% \\
  Total                &     73.0 & 0.2 & \%   &   9.1 & \% \\
  \bottomrule
\end{tabular}
```

Table 4: Monte Carlo estimates of the fraction of each process in the single lepton data sample. This table uses "S" format from `siunitx` and "±" as the intercolumn separator.

Category	μ	e
$b \to \ell$	65.2 ± 0.4 %	79.3 %
$b \to c \to \ell$	7.8 ± 0.3 %	5.4 %
Total	73.0 ± 0.2 %	9.1 %

same thing and avoiding the use of round-mode and round-precision is shown in the code for the right-hand table. Note the use of options for the S format and the use of `\num` enclosed in braces to format the row that requires a different precision. The macro `\tablenum` is available to achieve alignment in complicated situations, such as within a `\multicolumn` or `\multirow`. It is, in effect, a macro version of the S option. See the `siunitx` [2] manual for more details.

Cross-sections vs. η are usually not so difficult to format, as the magnitudes of the numbers do not change much from one bin to the next. The situation is different for cross-sections as a function of E_{T} or x. Tables 8 and 9 show examples of such tables.

round-mode=figures is in general best for cross-sections and their errors. A precision of 2 digits for the uncertainties is a good starting point, but will then have to be reduced to 1 digit in some cases. For the cross-section values, more digits (typically 3) probably have to be specified and the precision of some values will again have to be adjusted by hand. In Table 9(b) some of the rounding is adjusted by hand so that the numbers conform to the rules. For the asymmetric errors, round-mode=places is used and the precision of each asymmetric uncertainty is then set by hand. This works well if the cross-sections should all be shown with decimal points, but does not work if used to round a number such as 182. Hence the first row uses round-mode=figures. Even with the tools offered by `\siunitx` getting things exactly right is non-trivial.

Table 9 is probably the most challenging to format correctly, as the bin boundaries also vary by several

```
\caption{Monte Carlo estimates of the fraction of each process in
the single lepton data sample.
This table uses \texttt{\textbackslash phantom}.}%
\label{tab:example2}
\centering
\begin{tabular}{lcc}
  \toprule
  Category              &
  \multicolumn{1}{c}{\(\mu\)}&\multicolumn{1}{c}{\(e\)}\\
  \midrule
  \(b \to \ell\)       & \(    65.2 \pm 0.4\,\%\)   &     79.3\,\% \\
  \(b \to c \to \ell\) & \(\pho 7.8 \pm 0.3\,\%\)   & \pho 5.4\,\% \\
  Total                & \(    73.0 \pm 0.2\,\%\)   & \pho 9.1\,\% \\
  \bottomrule
\end{tabular}
```

Table 5: Monte Carlo estimates of the fraction of each process in the single lepton data sample. This table uses \phantom.

Category	μ	e
$b \to \ell$	$65.2 \pm 0.4\,\%$	$79.3\,\%$
$b \to c \to \ell$	$7.8 \pm 0.3\,\%$	$5.4\,\%$
Total	$73.0 \pm 0.2\,\%$	$9.1\,\%$

orders of magnitude. Table 10(a) gives the numbers with the option scientific-notation=fixed to illustrate the problem of what the table would look like if the cross-sections are output in pb. In Table 10(b) the exponential format of numbers is used to rescale the cross-section from pb to nb. \phantom had to be used in more places than we really like in order to get the final alignment correct. It may be possible to use the \tablenum instead, but this has not been tested.

```
\caption{Tables comparing different \Option{group-minimum-digits} values
for the package \Package{siunitx}.}
\label{tab:minimum-digits}
\centering
\subfloat[Table with \Option{group-minimum-digits=4}.]{%
\sisetup{group-minimum-digits=4}
\begin{tabular}{lS[table-format=5.2]}
  Quantity & \multicolumn{1}{c}{Value}\\
  \midrule
  Value1 & 1234.56\\
  Value2 & 98765.43
\end{tabular}
\label{tab:minimum-digits1}
}
\qquad
\subfloat[Table with \Option{group-minimum-digits=5}.]{%
\sisetup{group-minimum-digits=5}
\begin{tabular}{lS[table-format=5.2]}
  Quantity & \multicolumn{1}{c}{Value}\\
  \midrule
  Value1 & 1234.56\\
  Value2 & 98765.43
\end{tabular}
\label{tab:minimum-digits2}
}
```

Table 6: Tables comparing different group-minimum-digits values for the package `siunitx`.

Quantity	Value
Value1	1 234.56
Value2	98 765.43

(a) Table with group-minimum-digits=4.

Quantity	Value
Value1	1234.56
Value2	98 765.43

(b) Table with group-minimum-digits=5.

Table 7: A selection of cross-section measurements. Note that for numbers with asymmetric errors, the option `\sisetup` {retain-explicit-plus} is used to stop `siunitx` from dropping the plus signs on the positive errors. (although these tables look almost identical, the syntax used to create them is different — see Appendix A).

η_{jet}	$\mathrm{d}\sigma^b/\mathrm{d}\eta^b$ [pb]
$-1.60 : -1.10$	$0.574 \pm 0.094\ ^{+0.035}_{-0.031}$
$-1.10 : -0.80$	$1.21 \pm 0.21\ ^{+0.16}_{-0.16}$
$-0.80 : -0.50$	$2.14 \pm 0.22\ ^{+0.22}_{-0.12}$
$-0.50 : -0.20$	$2.33 \pm 0.21\ ^{+0.28}_{-0.21}$
$-0.20 : +0.10$	$2.64 \pm 0.22\ ^{+0.28}_{-0.23}$
$+0.10 : +0.50$	$3.16 \pm 0.21\ ^{+0.23}_{-0.17}$
$+0.50 : +1.40$	$2.88 \pm 0.15\ ^{+0.20}_{-0.30}$

η_{jet}	$\mathrm{d}\sigma^b/\mathrm{d}\eta^b$ [pb]
$-1.60 : -1.10$	$0.574 \pm 0.094\ ^{+0.035}_{-0.031}$
$-1.10 : -0.80$	$1.21 \pm 0.21\ ^{+0.16}_{-0.16}$
$-0.80 : -0.50$	$2.14 \pm 0.22\ ^{+0.22}_{-0.12}$
$-0.50 : -0.20$	$2.33 \pm 0.21\ ^{+0.28}_{-0.21}$
$-0.20 : +0.10$	$2.64 \pm 0.22\ ^{+0.28}_{-0.23}$
$+0.10 : +0.50$	$3.16 \pm 0.21\ ^{+0.23}_{-0.17}$
$+0.50 : +1.40$	$2.88 \pm 0.15\ ^{+0.20}_{-0.30}$

Table 8: Cross-section vs. E_{T}.

E_{T}	$\mathrm{d}\sigma/\mathrm{d}E_{\mathrm{T}}$ [pb GeV^{-1}]
$4 : 8$	$3\,630 \pm 110\ ^{+200}_{-180}$
$8 : 11$	$719 \pm 22\ ^{+43}_{-40}$
$11 : 14$	$215 \pm 9.7\ ^{+21}_{-20}$
$14 : 17$	$85.8 \pm 6.0\ ^{+10}_{-9.0}$
$17 : 20$	$35.4 \pm 3.9\ ^{+5.5}_{-5.4}$
$20 : 25$	$14.1 \pm 2.7\ ^{+3.5}_{-3.2}$
$25 : 35$	$2.38 \pm 0.97\ ^{+0.85}_{-0.86}$

(a) No special formatting and round-mode=figures. This is the starting point for more refined formatting.

E_{T} [GeV]	$\mathrm{d}\sigma/\mathrm{d}E_{\mathrm{T}}$ [pb GeV^{-1}]
$4 : 8$	$3\,630 \pm 110\ ^{+200}_{-180}$
$8 : 11$	$719 \pm 22\ ^{0}_{0}$
$11 : 14$	$210 \pm 10\ ^{0}_{0}$
$14 : 17$	$86 \pm 6\ ^{0}_{0}$
$17 : 20$	$35.4 \pm 3.9\ ^{+6}_{-5}$
$20 : 25$	$14.1 \pm 2.7\ ^{+3}_{-3}$
$25 : 35$	$2.4 \pm 1.0\ ^{+0.8}_{-0.9}$

(b) Numbers adjusted according to the recommendations. round-mode=places is used for asymmetric errors (except the first row). Some judicious use of `\phantom` is applied to get improved, but not yet perfect, alignment.

Table 9: Cross-section vs. x.

x	$\mathrm{d}\sigma/\mathrm{d}x$ [pb]
0.00008 : 0.0002	$10\,800\,000 \pm 870\,000\,^{+760\,000}_{-650\,000}$
0.0002 : 0.0006	$10\,800\,000 \pm 390\,000\,^{+570\,000}_{-440\,000}$
0.0006 : 0.002	$4\,970\,000 \pm 140\,000\,^{+260\,000}_{-230\,000}$
0.002 : 0.005	$1\,220\,000 \pm 31\,000\,^{+69\,000}_{-62\,000}$
0.005 : 0.01	$257\,000 \pm 12\,000\,^{+18\,000}_{-16\,000}$
0.01 : 0.1	$10\,700 \pm 790\,^{+910}_{-820}$

(a) No special formatting or rounding. Option scientific-notation=fixed used.

x	$\mathrm{d}\sigma/\mathrm{d}x$ [nb]
0.00008 : 0.0002	$11\,000 \pm 900\,^{+800}_{-600}$
0.0002 : 0.0006	$10\,800 \pm 400\,^{+600}_{-400}$
0.0006 : 0.0016	$4\,970 \pm 140\,^{+260}_{-230}$
0.0016 : 0.005	$1\,217 \pm 31\,^{+69}_{-62}$
0.005 : 0.01	$257 \pm 12\,^{+18}_{-16}$
0.01 : 0.1	$10.7 \pm 0.8\,^{+0.9}_{-0.8}$

(b) Several fixes including rescaled cross-section. Quite a lot of `\phantom` commands are applied to get alignment correct.

History

2014-11-25: Ian Brock First version of the document released.

2018-02-15: Ian Brock Moved table captions above tables to follow common convention.

2020-08-03: Ian Brock Removed code for TEX Live version older than 2013. More use of listings with `tcolorbox`. Added a bit of information on the use of `\tablenunm` macro.

References

[1] H. Abramowicz et al., *Rounding – ATLAS Recommendations*, URL: https://cds.cern.ch/record/1668799 (cit. on pp. 2, 5).

[2] *The International System of Units (SI)*, URL: http://www.ctan.org/tex-archive/macros/latex/contrib/siunitx (cit. on p. 6).

A LaTeX code for tables

This appendix gives the LaTeX code including the raw data used for Tables 7, 8 and 9. These files can be found in the `doc/atlas_tables` directory of the `atlaslatex` package.

A.1 Table 7

The files are: `cross-sections_charm-eta.tex` and `cross-sections_charm-eta.tex`:

```
\renewcommand{\arraystretch}{1.4}
\sisetup{round-mode = places}
\centering
\begin{tabular}{%
S@{\,:\,}S
r@{\,}@{$\pm$}@{\,}l@{\,}l
}
\toprule
\multicolumn{2}{c}{\etajet} & \multicolumn{3}{c}{\diffetab} \\
\multicolumn{2}{c}{} & \multicolumn{3}{c}{[\si{\pico\barn}]} \\
\midrule
{\num{-1.6}} & -1.1 & \numRP{0.574}{3} & \num[round-precision=3]{0.094} &
$^{\numRP{+0.035}{3}}_{\numRP{-0.031}{3}}$ \\
{\num{-1.1}} & -0.8 & \numRP{1.213}{2} & \num[round-precision=2]{0.211} &
$^{\numRP{+0.162}{2}}_{\numRP{-0.162}{2}}$ \\
{\num{-0.8}} & -0.5 & \numRP{2.141}{2} & \num[round-precision=2]{0.219} &
$^{\numRP{+0.223}{2}}_{\numRP{-0.123}{2}}$ \\
{\num{-0.5}} & -0.2 & \numRP{2.326}{2} & \num[round-precision=2]{0.210} &
$^{\numRP{+0.284}{2}}_{\numRP{-0.214}{2}}$ \\
{\num{-0.2}} & +0.1 & \numRP{2.641}{2} & \num[round-precision=2]{0.220} &
$^{\numRP{+0.283}{2}}_{\numRP{-0.233}{2}}$ \\
{\num{+0.1}} & +0.5 & \numRP{3.160}{2} & \num[round-precision=2]{0.211} &
$^{\numRP{+0.232}{2}}_{\numRP{-0.172}{2}}$ \\
{\num{+0.5}} & +1.4 & \numRP{2.881}{2} & \num[round-precision=2]{0.154} &
$^{\numRP{+0.201}{2}}_{\numRP{-0.301}{2}}$ \\
\bottomrule
\end{tabular}
```

```
\renewcommand{\arraystretch}{1.4}
\sisetup{round-mode = places, round-precision = 2}
\centering
\begin{tabular}{%
    S[table-format=3.2, table-number-alignment = right]@{\,:\,}S
    S[round-mode = places, round-precision = 2,
    table-format = 1.3, table-number-alignment = right]
    @{\(\,\pm\,\)}
    S[round-mode = places, round-precision = 2,
    table-format = 1.3, table-number-alignment = left]
    @{\,}l
    }
\toprule
\multicolumn{2}{c}{\etajet} & \multicolumn{3}{c}{\diffetab} \\
\multicolumn{2}{c}{} & \multicolumn{3}{c}{[\si{\pico\barn}]} \\
\midrule
-1.6 & -1.1 & {\numRP{0.574}{3}} & {\numRP{0.094}{3}} & \(^{\numRP{+0.035}{3}}_{\numRP{-0.031}{3}}\) \\
-1.1 & -0.8 & 1.213 & 0.211 & \(^{\num{+0.162}}_{\num{-0.162}}\) \\
-0.8 & -0.5 & 2.141 & 0.219 & \(^{\num{+0.223}}_{\num{-0.123}}\) \\
-0.5 & -0.2 & 2.326 & 0.210 & \(^{\num{+0.284}}_{\num{-0.214}}\) \\
-0.2 & +0.1 & 2.641 & 0.220 & \(^{\num{+0.283}}_{\num{-0.233}}\) \\
+0.1 & +0.5 & 3.160 & 0.211 & \(^{\num{+0.232}}_{\num{-0.172}}\) \\
+0.5 & +1.4 & 2.881 & 0.154 & \(^{\num{+0.201}}_{\num{-0.301}}\) \\
\bottomrule
\end{tabular}
```

A.2 Table 8

The files are: `cross-sections_charm-ET1.tex` and `cross-sections_charm-ET2.tex`:

```
% Charm differential cross sections d sigma / dY in bins of ET
\sisetup{round-mode=figures, round-precision=2,
  group-digits=integer, group-minimum-digits=4}
\begin{tabular}{%
    S[table-format=2.0, table-number-alignment=right,
    round-mode=places, round-precision=0]@{$\,:\,$}
    S[table-format=2.0, table-number-alignment=left,
    round-mode=places, round-precision=0]
    S[table-format=4.2, table-number-alignment=right,
    round-mode=figures, round-precision=3]@{$\,\pm\,$}
    S[table-format=3.2, table-number-alignment=right,
    round-mode=figures, round-precision=2]@{$\,$}l}
  \toprule
  \multicolumn{2}{c}{\ET} &
  \multicolumn{3}{c}{$\dif\sigma / \dif\ET$}\\
  \multicolumn{2}{c}{\mbox{}} & \multicolumn{3}{c}{[\si{\pico\barn\per\GeV}]}\\
  \midrule
 4.2 & 8.0  & 3634.06 & 114.491  & \numpmerr{+201.404 }{-181.511}{2}  \\
 8.0 & 11.0 & 719.458 & 21.9334  & \numpmerr{+43.3087 }{-39.7824}{2}  \\
11.0 & 14.0 & 214.572 & 9.71991  & \numpmerr{+20.5413 }{-19.6464}{2}  \\
14.0 & 17.0 & 85.7584 & 6.03401  & \numpmerr{+10.0875 }{-8.99952}{2}  \\
17.0 & 20.0 & 35.4095 & 3.91591  & \numpmerr{+5.5349  }{-5.41347}{2}  \\
20.0 & 25.0 & 14.1253 & 2.72552  & \numpmerr{+3.46528 }{-3.22476}{2}  \\
25.0 & 35.0 & 2.37786 & 0.968562 & \numpmerr{+0.849647}{-0.855525}{2} \\
  \bottomrule
\end{tabular}
```

```
% Charm differential cross sections d sigma / dY in bins of ET
\sisetup{round-mode=figures, round-precision=2,
  group-digits=integer, group-minimum-digits=4}
\begin{tabular}{%
    S[table-format=2.0, table-number-alignment=right,
    round-mode=places, round-precision=0]@{$\,:\,$}
    S[table-format=2.0, table-number-alignment=left,
    round-mode=places, round-precision=0]
    S[table-format=4.1, table-alignment=right,
    round-mode=figures, round-precision=3]@{$\,\pm\,$}
    S[table-format=3.1, table-alignment=right,
    round-mode=figures, round-precision=2]@{$\,$}r}
  \toprule
  \multicolumn{2}{c}{\ET} &
  \multicolumn{3}{c}{$\dif\sigma / \dif\ET$}\\
  \multicolumn{2}{c}{[\si{\GeV}]} & \multicolumn{3}{c}{[\si{\pico\barn\per\GeV}]}\\
  \midrule
 4.2 & 8.0  & 3634.06                    & 114.491
& \numpmRF{+201.404 }{-181.511 }{2}  \\
 8.0 & 11.0 & 719.458                    & 21.9334
& \numpmerr{+43.3087 }{-39.7824 }{0} \\
11.0 & 14.0 & {\numRF{214.572}{2}\phdo}  & {\numRF{9.71991}{1}\phdo}
& \numpmerr{+20.5413 }{-19.6464 }{0} \\
14.0 & 17.0 & {\numRF{85.7584}{2}\phdo}  & {\numRF{6.03401}{1}\phdo}
& \numpmerr{+10.0875 }{-8.99952 }{0} \\
17.0 & 20.0 & {\numRF{35.4095}{3}}       & {\numRF{3.91591}{2}}
& \numpmerr{+5.5349  }{-5.41347 }{1} \\
20.0 & 25.0 & 14.1253                    & 2.72552
& \numpmerr{+3.46528 }{-3.22476 }{1} \\
25.0 & 35.0 & {\numRF{2.37786}{2}}       & {\numRF{0.968562}{1}}
& \numpmerr{+0.849647}{-0.855525}{1}  \\
  \bottomrule
\end{tabular}
```

A.3 Table 9

The files are: `cross-sections_charm-x1.tex` and `cross_sections-charm-x2.tex`:

```
% Charm differential cross sections d sigma / dY in bins of xda
\sisetup{round-mode=figures, round-precision=2,
  group-digits=integer, group-minimum-digits=4}
\sisetup{scientific-notation=fixed, fixed-exponent=0}
\begin{tabular}{%
    S[table-format=1.5, table-number-alignment=right,
    round-mode=figures, round-precision=1]@{$\,:\,$}
    S[table-format=1.5, table-number-alignment=left,
    round-mode=figures, round-precision=1]
    S[table-format=8.0, table-number-alignment=right,
    round-mode=figures, round-precision=3]@{$\,\pm\,$}
    S[table-format=6.0, table-number-alignment=right,
    round-mode=figures, round-precision=2]@{$\,$}r}
  \toprule
  \multicolumn{2}{c}{$x$} &
  \multicolumn{3}{c}{$\dif\sigma / \dif x$}\\
  \multicolumn{2}{c}{\mbox{}} & \multicolumn{3}{c}{[\si{\pico\barn}]}\\
  \midrule
0.00008 & 0.00020 & 1.08474e+07 & 867945  & \numpmerr{+761437 }{-647690 }{2}  \\
0.00020 & 0.00060 & 1.08385e+07 & 388976  & \numpmerr{+567443 }{-441257 }{2}  \\
0.00060 & 0.00160 & 4.974e+06   & 135404  & \numpmerr{+256385 }{-233376 }{2}  \\
0.00160 & 0.00500 & 1.21664e+06 & 31162.1 & \numpmerr{+68948.1}{-62459.6}{2} \\
0.00500 & 0.01000 & 256870      & 12232.7 & \numpmerr{+18363.7}{-16463.7}{2} \\
0.01000 & 0.10000 & 10652.6     &  791.21 & \numpmerr{+913.118}{-815.675}{2} \\
  \bottomrule
\end{tabular}
```

```
% Charm differential cross sections d sigma / dY in bins of xda
\sisetup{round-mode=figures, round-precision=2,
  group-digits=integer, group-minimum-digits=4}
\sisetup{scientific-notation=fixed, fixed-exponent=0}
\begin{tabular}{%
    S[table-format=1.5, table-number-alignment=right,
    round-mode=figures, round-precision=1]@{$\,:\,$}
    S[table-format=1.5, table-number-alignment=left,
    round-mode=figures, round-precision=1]
    S[table-format=5.1, table-alignment=right,
    round-mode=figures, round-precision=4]@{$\,\pm\,$}
    S[table-format=3.1, table-alignment=right,
    round-mode=figures, round-precision=2]@{$\,$}r}
  \toprule
  \multicolumn{2}{c}{$x$} &
  \multicolumn{3}{c}{$\dif\sigma / \dif x$}\\
  \multicolumn{2}{c}{\mbox{}} & \multicolumn{3}{c}{[\si{\nano\barn}]}\\
  \midrule
0.00008 & 0.00020                 & {\numRF{1.08474e+04}{2}\phdo}
& {\numRF{867945e-3}{1}\phdo}  & \numpmerr{+761437 e-3}{-647690 e-3}{1} \\
0.00020 & 0.00060                 & {\numRF{1.08385e+04}{3}\phdo}
& {\numRF{388976e-3}{1}\phdo}  & \numpmerr{+567443 e-3}{-441257 e-3}{1} \\
0.00060 & {\numRF{0.0016}{2}\pho} & {\numRF{4.974e+03}{3}\phdo}
& 135404e-3                    & \numpmerr{+256385 e-3}{-233376 e-3}{2} \\
{\numRF{0.0016}{2}\pho} & 0.00500 & {\numRF{1.21664e+03}{4}\phdo}
& 31162.1e-3                   & \numpmerr{+68948.1e-3}{-62459.6e-3}{2} \\
0.00500 & 0.01000               & {\numRF{256870e-03}{3}\phdo}
& 12232.7e-3                   & \numpmerr{+18363.7e-3}{-16463.7e-3}{2} \\
0.01000 & 0.10000               & {\numRF{10652.6e-03}{3}}
& {\numRF{791.21e-3}{1}}       & \numpmerr{+913.118e-3}{-815.675e-3}{1} \\
  \bottomrule
\end{tabular}
```