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Article Title

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**Abstract**

The abstract serves both as a general introduction to the topic and

as a brief, non-technical summary of the main results and their

implications. Authors are advised to check the author instructions

for the journal they are submitting to for word limits and if struc-

tural elements like subheadings, citations, or equations are permitted.

**Keywords:** keyword1, Keyword2, Keyword3, Keyword4

**1 Introduction**

The Introduction section, of referenced text [[1](#br12)] expands on the background

of the work (some overlap with the Abstract is acceptable). The introduction

should not include subheadings.

Springer Nature does not impose a strict layout as standard however

authors are advised to check the individual requirements for the journal they

are planning to submit to as there may be journal-level preferences. When

preparing your text please also be aware that some stylistic choices are not sup-

ported in full text XML (publication version), including coloured font. These

will not be replicated in the typeset article if it is accepted.

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**2 Results**

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

**3 This is an example for ﬁrst level**

**head—section head**

**3.1 This is an example for second level head—subsection**

**head**

**3.1.1 This is an example for third level head—subsubsection**

**head**

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

**4 Equations**

Equations in LT X can either be inline or on-a-line by itself (“display

A E

equations”). For inline equations use the $...$ commands. E.g.: The equation

Hψ = Eψ is written via the command $H \psi = E \psi$.

For display equations (with auto generated equation numbers) one can use

the equation or align environments:

~~ꢁ~~

~~ꢁ~~

~~ꢁ~~

~~ꢁ~~

~~ꢀ~~p

2

~~ꢀ~~q

2

~~ꢁ~~ ˜

~~ꢁ~~

~~ꢁ~~ ˜

~~ꢁ~~

(k)

+

Z (k)

~~ꢁ~~Y

~~ꢁ~~

~~ꢁ~~

~~ꢁ~~

i

j

˜

i=1

j=1

ꢀX(k)ꢀ ≤

2

.

(1)

p + q

where,

λa

2

D = ∂ − ig

A

a

μ

μ

μ

a =

μν

∂ A − ∂ A

a

a +

μ

abc

gf A A

b

a

μ ν

(2)

F

μ

ν

ν

Notice the use of \nonumber in the align environment at the end of each line,

except the last, so as not to produce equation numbers on lines where no

equation numbers are required. The \label{} command should only be used

at the last line of an align environment where \nonumber is not used.

ꢄ

ꢅ

ꢂ

ꢃ−3

m

GeV

3 ln(m/GeV) ln(c2/5)

=

1 +

+

(3)

Y∞

15

15

The class ﬁle also supports the use of \mathbb{}, \mathscr{} and \mathcal{}

commands. As such \mathbb{R}, \mathscr{R} and \mathcal{R} produces R,

R and R respectively (refer Subsubsection [3.1.1](#br2)).



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**5 Tables**

Tables can be inserted via the normal table and tabular environment. To

put footnotes inside tables you should use \footnotetext[]{...} tag. The

footnote appears just below the table itself (refer Tables [1](#br3) and [2](#br4)). For the

corresponding footnotemark use \footnotemark[...]

**Table 1** Caption text

Column 1 Column 2 Column 3 Column 4

row 1

row 2

row 3

data 1

data 4

data 7

data 2

data 51

data 8

data 3

data 6

data 92

Source: This is an example of table footnote.

This is an example of table footnote.

1Example for a ﬁrst table footnote. This is an

example of table footnote.

2Example for a second table footnote. This is

an example of table footnote.

The input format for the above table is as follows:

\begin{table}[<placement-specifier>]

\begin{center}

\begin{minipage}{<preferred-table-width>}

\caption{<table-caption>}\label{<table-label>}%

\begin{tabular}{@{}llll@{}}

\toprule

Column 1 & Column 2 & Column 3 & Column 4\\

\midrule

row 1 & data 1 & data 2 & data 3 \\

row 2 & data 4 & data 5\footnotemark[1] & data 6 \\

row 3 & data 7 & data 8 & data 9\footnotemark[2]\\

\botrule

\end{tabular}

\footnotetext{Source: This is an example of table footnote.

This is an example of table footnote.}

\footnotetext[1]{Example for a first table footnote.

This is an example of table footnote.}

\footnotetext[2]{Example for a second table footnote.

This is an example of table footnote.}

\end{minipage}

\end{center}

\end{table}



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**Table 2** Example of a lengthy table which is set to full textwidth

Element 11

Element 22

Project

Energy

σcalc

σexpt

Energy

σcalc

σexpt

Element 3

Element 4

990 A

500 A

1168

961

1547 ± 12

922 ± 10

780 A

900 A

1166

1268

1239 ± 100

1092 ± 40

Note: This is an example of table footnote. This is an example of table footnote this is an

example of table footnote this is an example of table footnote this is an example of table

footnote.

1Example for a ﬁrst table footnote.

2Example for a second table footnote.

In case of double column layout, tables which do not ﬁt in single

column width should be set to full text width. For this, you need to

use \begin{table\*} ... \end{table\*} instead of \begin{table} ...

\end{table} environment. Lengthy tables which do not ﬁt in textwidth should

be set as rotated table. For this, you need to use \begin{sidewaystable} ...

\end{sidewaystable} instead of \begin{table\*} ... \end{table\*} envi-

ronment. This environment puts tables rotated to single column width. For

tables rotated to double column width, use \begin{sidewaystable\*} ...

\end{sidewaystable\*}.

**6 Figures**

As per the LT X standards you need to use eps images for LT X compila-

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tion and pdf/jpg/png images for PDFLaTeX compilation. This is one of the

major diﬀerence between LT X and PDFLaTeX. Each image should be from a

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single input .eps/vector image ﬁle. Avoid using subﬁgures. The command for

inserting images for LT X and PDFLaTeX can be generalized. The package used

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to insert images in LaTeX/PDFLaTeX is the graphicx package. Figures can be

inserted via the normal ﬁgure environment as shown in the below example:

\begin{figure}[<placement-specifier>]

\centering

\includegraphics{<eps-file>}

\caption{<figure-caption>}\label{<figure-label>}

\end{figure}

In case of double column layout, the above format puts ﬁgure caption-

s/images to single column width. To get spanned images, we need to provide

\begin{figure\*} ... \end{figure\*}.

For sample purpose, we have included the width of images in the optional

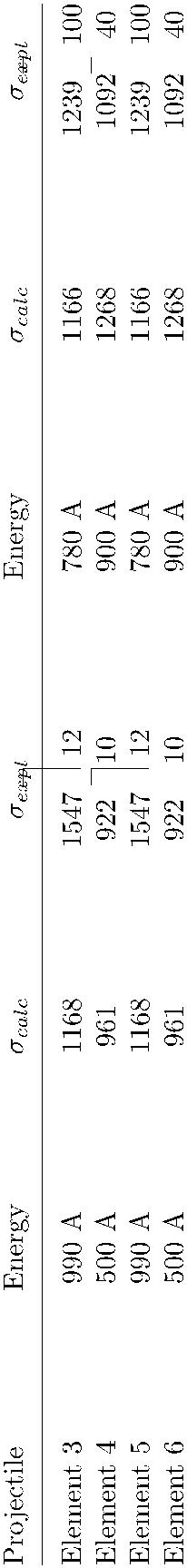
argument of \includegraphics tag. Please ignore this.



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**Fig. 1** This is a wideﬁg. This is an example of long caption this is an example of long

caption this is an example of long caption this is an example of long caption

**7 Algorithms, Program codes and Listings**

Packages algorithm, algorithmicx and algpseudocode are used for setting

algorithms in LATEX using the format:

\begin{algorithm}

\caption{<alg-caption>}\label{<alg-label>}

\begin{algorithmic}[1]

. . .

\end{algorithmic}

\end{algorithm}

You may refer above listed package documentations for more details

before setting algorithm environment. For program codes, the “program”

package is required and the command to be used is \begin{program} ...

\end{program}. A fast exponentiation procedure:

begin

for i := 1 to 10 step 1 do

expt(2, i);

newline() od

Comments will be set ﬂush to the right margin

where

proc expt(x, n) ≡

z := 1;

do if n = 0 then exit ﬁ;

do if odd(n) then exit ﬁ;

comment: This is a comment statement;

n := n/2; x := x ∗ x od;

{n > 0};

n := n − 1; z := z ∗ x od;

print(z)**.**

end

Similarly, for listings, use the listings package. \begin{lstlisting}

... \end{lstlisting} is used to set environments similar to verbatim

environment. Refer to the lstlisting package documentation for more

details.



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**Algorithm 1** Calculate y = xn

**Require:** n ≥ 0 ∨ x = 0

**Ensure:** y = xn

1: y ⇐ 1

2: **if** n < 0 **then**

3:

X ⇐ 1/x

4:

N ⇐ −n

5: **else**

6:

X ⇐ x

7:

N ⇐ n

8: **end if**

9: **while** N = 0 **do**

10:

**if** N is even **then**

11:

12:

13:

14:

15:

16:

X ⇐ X × X

N ⇐ N/2

**else**[N is odd]

y ⇐ y × X

N ⇐ N − 1

**end if**

17: **end while**

**for** i :=**maxint to** 0 **do**

**begin**

{ do nothing }

**end** ;

**Write**( ’ Case i n s e n s i t i v e ’ ) ;

**Write**( ’ Pascal keywords . ’ ) ;

**8 Cross referencing**

Environments such as ﬁgure, table, equation and align can have a label declared

via the \label{#label} command. For ﬁgures and table environments use the

\label{} command inside or just below the \caption{} command. You can

then use the \ref{#label} command to cross-reference them. As an example,

consider the label declared for Figure [1](#br6) which is \label{fig1}. To cross-

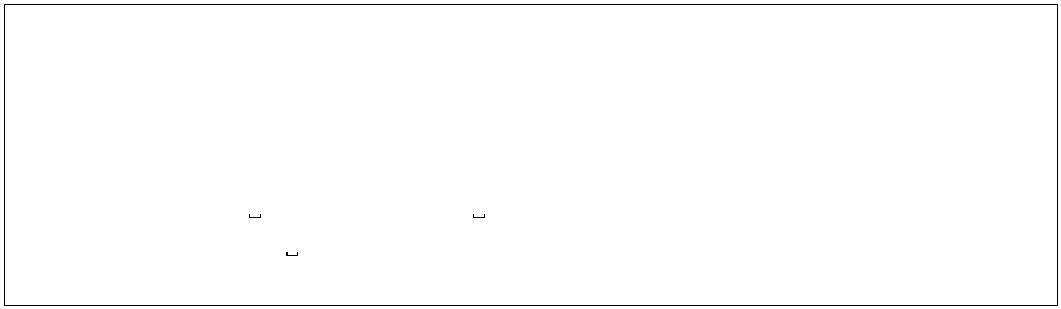
reference it, use the command Figure \ref{fig1}, for which it comes up as

“Figure [1](#br6)”.

To reference line numbers in an algorithm, consider the label declared for

the line number 2 of Algorithm [1](#br7) is \label{algln2}. To cross-reference it, use

the command \ref{algln2} for which it comes up as line [2](#br7) of Algorithm [1](#br7).



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**8.1 Details on reference citations**

Standard LT X permits only numerical citations. To support both numerical

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and author-year citations this template uses natbib LT X package. For style

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guidance please refer to the template user manual.

Here is an example for \cite{...}: [[1](#br12)]. Another example for \citep{...}:

[[2](#br12)]. For author-year citation mode, \cite{...} prints Jones et al. (1990) and

\citep{...} prints (Jones et al., 1990).

All cited bib entries are printed at the end of this article: [[3](#br12)], [[4](#br12)], [[5](#br12)], [[6](#br12)],

[[7](#br12)], [[8](#br12)], [[9](#br12)], [[10](#br12)], [[11](#br12)] and [[12](#br13)].

**9 Examples for theorem like environments**

For theorem like environments, we require amsthm package. There are three

types of predeﬁned theorem styles exists—thmstyleone, thmstyletwo and

thmstylethree

thmstyleone

thmstyletwo

Numbered, theorem head in bold font and theorem

text in italic style

Numbered, theorem head in roman font and theorem

text in italic style

thmstylethree Numbered, theorem head in bold font and theorem

text in roman style

For mathematics journals, theorem styles can be included as shown in the

following examples:

**Theorem 1** (Theorem subhead) Example theorem text. Example theorem text.

Example theorem text. Example theorem text. Example theorem text. Example

theorem text. Example theorem text. Example theorem text. Example theorem text.

Example theorem text. Example theorem text.

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

**Proposition 2** Example proposition text. Example proposition text. Example propo-

sition text. Example proposition text. Example proposition text. Example proposition

text. Example proposition text. Example proposition text. Example proposition text.

Example proposition text.

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

Example 1 Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed

diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam



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ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat

magna. Nunc eleifend consequat lorem.

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

Remark 1 Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed

diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam

ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat

magna. Nunc eleifend consequat lorem.

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

**Deﬁnition 1** (Deﬁnition sub head) Example deﬁnition text. Example deﬁnition

text. Example deﬁnition text. Example deﬁnition text. Example deﬁnition text.

Example deﬁnition text. Example deﬁnition text. Example deﬁnition text.

Additionally a predeﬁned “proof” environment is available: \begin{proof}

... \end{proof}. This prints a “Proof” head in italic font style and the

“body text” in roman font style with an open square at the end of each proof

environment.

Proof Example for proof text. Example for proof text. Example for proof text. Exam-

ple for proof text. Example for proof text. Example for proof text. Example for proof

text. Example for proof text. Example for proof text. Example for proof text.

ꢀ

Sample body text. Sample body text. Sample body text. Sample body text.

Sample body text. Sample body text. Sample body text. Sample body text.

Proof of Theorem [1](#br8) Example for proof text. Example for proof text. Example for

proof text. Example for proof text. Example for proof text. Example for proof text.

Example for proof text. Example for proof text. Example for proof text. Example

for proof text.

ꢀ

For a quote environment, use \begin{quote}...\end{quote}

Quoted text example. Aliquam porttitor quam a lacus. Praesent vel arcu ut tortor

cursus volutpat. In vitae pede quis diam bibendum placerat. Fusce elementum

convallis neque. Sed dolor orci, scelerisque ac, dapibus nec, ultricies ut, mi. Duis

nec dui quis leo sagittis commodo.

Sample body text. Sample body text. Sample body text. Sample body

text. Sample body text (refer Figure [1](#br6)). Sample body text. Sample body text.

Sample body text (refer Table [3](#br5)).

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**10 Methods**

Topical subheadings are allowed. Authors must ensure that their Methods

section includes adequate experimental and characterization data necessary for

others in the ﬁeld to reproduce their work. Authors are encouraged to include

RIIDs where appropriate.

**Ethical approval declarations** (only required where applicable) Any

article reporting experiment/s carried out on (i) live vertebrate (or higher

invertebrates), (ii) humans or (iii) human samples must include an unam-

biguous statement within the methods section that meets the following

requirements:

1. Approval: a statement which conﬁrms that all experimental protocols were

approved by a named institutional and/or licensing committee. Please

identify the approving body in the methods section

2. Accordance: a statement explicitly saying that the methods were carried

out in accordance with the relevant guidelines and regulations

3. Informed consent (for experiments involving humans or human tissue sam-

ples): include a statement conﬁrming that informed consent was obtained

from all participants and/or their legal guardian/s

If your manuscript includes potentially identifying patient/participant

information, or if it describes human transplantation research, or if it reports

results of a clinical trial then additional information will be required. Please

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[Nature journals, or (https://www.biomedcentral.com/getpublished/editorial-](https://www.springer.com/gp/authors-editors/journal-author/journal-author-helpdesk/publishing-ethics/14214)

[policies#ethics+and+consent) for BMC.](https://www.biomedcentral.com/getpublished/editorial-policies#ethics+and+consent)

**11 Discussion**

Discussions should be brief and focused. In some disciplines use of Discussion or

‘Conclusion’ is interchangeable. It is not mandatory to use both. Some journals

prefer a section ‘Results and Discussion’ followed by a section ‘Conclusion’.

Please refer to Journal-level guidance for any speciﬁc requirements.

**12 Conclusion**

Conclusions may be used to restate your hypothesis or research question,

restate your major ﬁndings, explain the relevance and the added value of your

work, highlight any limitations of your study, describe future directions for

research and recommendations.

In some disciplines use of Discussion or ’Conclusion’ is interchangeable. It

is not mandatory to use both. Please refer to Journal-level guidance for any

speciﬁc requirements.

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**Supplementary information.** If your article has accompanying supple-

mentary ﬁle/s please state so here.

Authors reporting data from electrophoretic gels and blots should supply

the full unprocessed scans for key as part of their Supplementary information.

This may be requested by the editorial team/s if it is missing.

Please refer to Journal-level guidance for any speciﬁc requirements.

**Acknowledgments.** Acknowledgments are not compulsory. Where included

they should be brief. Grant or contribution numbers may be acknowledged.

Please refer to Journal-level guidance for any speciﬁc requirements.

**Declarations**

Some journals require declarations to be submitted in a standardised format.

Please check the Instructions for Authors of the journal to which you are

submitting to see if you need to complete this section. If yes, your manuscript

must contain the following sections under the heading ‘Declarations’:

• Funding

• Conﬂict of interest/Competing interests (check journal-speciﬁc guidelines

for which heading to use)

• Ethics approval

• Consent to participate

• Consent for publication

• Availability of data and materials

• Code availability

• Authors’ contributions

If any of the sections are not relevant to your manuscript, please include the

heading and write ‘Not applicable’ for that section.

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[editorial-policies](https://www.nature.com/nature-research/editorial-policies)

Scientiﬁc Reports: [https://www.nature.com/srep/journal-policies/editorial-](https://www.nature.com/srep/journal-policies/editorial-policies)

[policies](https://www.nature.com/srep/journal-policies/editorial-policies)

BMC journals: [https://www.biomedcentral.com/getpublished/editorial-](https://www.biomedcentral.com/getpublished/editorial-policies)

[policies](https://www.biomedcentral.com/getpublished/editorial-policies)

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**Appendix A Section title of ﬁrst appendix**

An appendix contains supplementary information that is not an essential part

of the text itself but which may be helpful in providing a more comprehen-

sive understanding of the research problem or it is information that is too

cumbersome to be included in the body of the paper.

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