Template demonstrating the quantumarticle class

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In the standard, `twocolumn`, layout the abstract is typeset as a bold face first paragraph. Quantum also supports a `onecolumn` layout with the abstract above the text. Both can be combined with the `titlepage` option to obtain a format with dedicated title and abstract pages that are not included in the page count. This format can be more suitable for long articles. The `abstract` environment can appear both before and after the `\maketitle` command and calling `\maketitle` is optional, as long as there is an `abstract`. Both `abstract` and `\maketitle` however must be placed after all other `\author`, `\affiliation`, etc. commands.

In the `twocolumn` layout and without the `titlepage` option there can be a paragraph directly following the abstract before the first section. In `onecolumn` format or with a dedicated `titlepage`, this should be avoided.

Note that clicking the title performs a search for that title on quantum-journal.org. In this way readers can easily verify whether a work using the quantumarticle class was actually published in Quantum.

1 Sectioning and equations

Sections, subsections, subsubsections, and paragraphs should be typeset with the standard LaTeX commands. You can use use the standard

Christian Gogolin: latex@quantum-journal.org, http://quantum-journal.org, You can use the `\email`, `\homepage`, and `\thanks` commands to add additional information for the preceding `\author`. If applicable, this can also be used to indicate that a work has previously been published in conference proceedings.
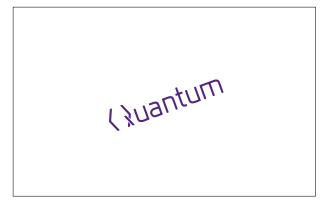

Figure 1: Every figure must have an informative caption and a number. The caption can be placed above, below, or to the side of the figure, as you see fit. The same applies for tables, boxes, and other floating elements.

commands for equations. For multi-line equations `align` is preferable over `eqnarray`.

$$E = m\,c^2 \tag{1}$$
$$a^2 + b^2 = c^2 \tag{2}$$
$$H\,|\psi\rangle = E\,|\psi\rangle \tag{3}$$
$$(\mathbb{1} \otimes A)\,(B \otimes \mathbb{1}) = A \otimes B \tag{4}$$

Whether you prefer to refer to equations as Eq. (1), Equation 1, or just (1) is up to you, but please be consistent and use the `\eqref{...}` command instead of writing (`\ref{...}`).

1.1 Figures

See Fig. 1 for an example of how to include figures. Feel free to place them at the top or bottom of the page, or in the middle of a paragraph as you see fit. Try to place them on the same page as the text referring to them. A figure on the first page can help readers remember and recognize your work more easily.

1.2 Citations and footnotes

References to other works appear in the References section at the end of the work.

Theorem 1 (DOI links are required)
Important: As Quantum is a member of Crossref all references to works that have a DOI must be hyperlinked according to the DOI.

This can be achieved in several ways, depending on how you format your bibliography. Suppose the DOI of an article [1] that you want to cite is `10.22331/idonotexist`. If you are formating your bibliography manually, you can cite this work using the following in your `thebibliography` environment:

```
\bibitem{examplecitation}
  Name Surname,
  \href{https://doi.org/10.22331/
      idonotexist}{Quantum
      \textbf{123}, 123456 (1916).}
```

If you are using BibTeX, you can load the `natbib` package by putting

```
\usepackage[numbers,sort&compress]{natbib}
```

in the preamble of your document and then use the `plainnat` citation style by including your BibTeX bibliography `mybibliography.bib` where you want the bibliography to appear as follows:

```
\bibliographystyle{plainnat}
\bibliography{mybibliography}
```

The quantumarticle class automatically detects that the `natbib` package was loaded and redefines the `\doi` command to create hyperlinks. This is likely the easiest option if you are converting from another document class. If you want to used BibLaTeX, you can instead add

```
\usepackage[backend=bibtex]{biblatex}
\addbibresource{mybibliography.bib}
```

to the preamble of your document and then output the bibliography with

```
\printbibliography
```

where appropriate.

The quantumarticle class automatically detects that the `biblatex` package was loaded, sets the default option `doi=true` to include the DOI in the bibliography, and declared a suitable field format to make it a hyperlink. Due to issues with `biber` we recommend to use the `bibtex` backend of `biblatex`.

We encourage the use of BibTeX and/or BibLaTeX to generate your bibliography from the BibTeX meta-data provided by publishers. For DOI linking to work, the BibTeX file must contain the `doi` field as for example in:

```
@article{examplecitation,
  author = {Surname, Name},
  title = {Title},
  journal = {Quantum},
  volume = {123},
  page = {123456},
  year = {1916},
  doi = {10.1103/PhysRevLett.107.120501},
}
```

More information on how to get DOI links in your document can be found on StackExchange [2, 3]. Feel free to change the appearance of citations in any way you like by using a different `bibliographystyle` or via the advanced mechanisms provided by BibLaTeX. The only two requirements are that citations must uniquely identify the cited work and that they must contain a DOI hyperlink whenever possible.

Footnotes[1] appear in the bottom of the page.

2 Summary section

Longer articles should include a section that, early on, explains the main results, their limitations, and assumptions. Depending on the target audience this section can be used to, for example, present the main theorem, or provide a summary of the results for a wider audience.

3 Extra packages

Quantum encourages you to load the following extra packages:

```
\usepackage[utf8]{inputenc}
\usepackage[english]{babel}
\usepackage[T1]{fontenc}
\usepackage{amsmath}
\usepackage{hyperref}
```

---

[1]Only use footnotes when appropriate.

If you do not load the `hyperref` package, quantumarticle automatically loads it for you. Packages that change font settings, such as `times` or `helvet` should be avoided.

Paragraphs The paragraph is the smallest unit of sectioning. Feel free to end the paragraph title with a full stop if you find this appropriate.

4 Wide equations

Very wide equations can be shown expanding over both columns using the `widetext` environment. In `onecolumn` mode, the `widetext` environment has no effect.

$$|\mathrm{AME}(n=6,q=5)\rangle = \sum_{i,j,k=0}^{4} |i,j,k,i+j+k,i+2j+3k,i+3j+4k\rangle \tag{5}$$

References

[1] Name Surname, Quantum **123**, 123456 (1916).

[2] StackExchange discussion on "How to get DOI links in bibliography" (2016-11-18)

[3] StackExchange discussion on "Automatically adding DOI fields to a hand-made bibliography" (2016-11-18)

A First section of the appendix

Quantum allows the usage of appendices. Appendices should appearer after the main References.

A.1 Subsection

Ideally, the command `\appendix` should be put before the appendices to get appropriate section numbering. The appendices are then numbered alphabetic, with numeric (sub)subsection numbering. Equations continue to be numbered sequentially.

$$A \neq B \tag{6}$$

You are free to change this in case it is more appropriate for your article, but a consistent and unambiguous numbering of sections and equations must be ensured.

If you want your appendices to appear in `onecolumn` mode but the rest of the document in `twocolumn` mode, you can insert the command `\onecolumn\newpage` before `\appendix`.

B Problems and Bugs

In case you encounter problems using the article class please consider opening a bug report in our bug-tracker under https://github.com/cgogolin/quantum-journal/issues or contact us via email under latex@quantum-journal.org.