

Science AMA Series: Can science publishing be free, open and transparent? We believe so! We are Quantum, the community-driven open journal for quantum science. Ask us about science publishing and what you'd want from a good journal, including ours.

Quantum_{journal}¹and_r/ScienceAMAs¹

¹Affiliation not available

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Open access is a great movement, but like anything worthwhile there's always a cost. Do you think the academic funding model is mature/well-funded enough to enable authors to fund open access sustainably into the future?

[ScienceLit16](#)

This highly depends on how efficient open-access is implemented and whether open-access publication fees are mandatory or voluntary. Publication fees of several thousand dollars are surely not affordable for many groups. On the contrary, we think that Quantum will be able to work sustainable already if a reasonable fraction of authors is willing/able to pay a (in principle voluntary) publication fee of the order of ~100€. *Christian*

In my experience of publishing in theoretical/computational condensed matter physics, the quality of the referees is hugely variable. Even in the top journals like PRL, you are lucky to get one referee who can provide reasonable feedback.

I don't mind being rejected for scientific reasons but it's incredibly frustrating when you get rejected by somebody who clearly didn't understand your work.

Do you have some idea on how to deal with this problem? Maybe using a bigger pool of referees including postdocs? or maybe having some scheme whereby referees are refereed themselves.

[AmateurLobster](#)

Great question. We put a big deal of thinking into this, and we have two main strategies:

Editors are experts: we have an [editorial board of forty](#), such that each editor should only handle submissions of their field of expertise (essentially papers they would be comfortable reviewing themselves). This will allow editors to better judge the quality of reviews, and to find referees who are



experts.

Ask specific questions: instead of a free-form referee review form, Quantum guides referees through [specific questions](#) about the relevant aspects of the paper, for example:

- Summary: what are the main questions posed by the paper, and how does it answer them? What is the main contribution of the paper?
- Comment on the technical contribution of the paper, focusing on correctness and reproducibility. Are the proofs clear and easy to reproduce? Is the experimental or numerical data (or software) openly available? Are the experimental methods and/or mathematical tools appropriate? Do the technical results represent a significant step forward in this problem?
- Comment on the conceptual contribution of the paper. Does it open new questions? Does it uncover limitations of previous approaches? Does it introduce a new perspective on the topic? Does it solve a long-standing problem? Does it make a widespread intuition rigorous, or prove it wrong? Does it provide a useful analysis of a failed experiment or fruitless technique? Is it a good review of a subject?
- Comment on the presentation of the paper. Is it well written? Are the main results clearly laid out? Does the manuscript clearly describe assumptions and limitations?

We will monitor how this influences the quality of peer review and make adjustments as necessary.~
Lidia

Despite being listed among the answerers, but I also have a question.

This year saw Nature publish a [paper](#) based on data generated in a quantum computer game.

Despite the unique starting point, they wrote a fairly normal looking paper. Which is unsurprising given that they wanted to be published in a journal like Nature. But when I start writing a paper based on [my own citizen science project](#), I imagine I won't want to be so restricted.

Would Quantum allow authors to diverge more from the normal view of what a paper should look like? Could there be less emphasis on text, and more on other media (so long as the arXiv supports it)? Could they be written in a style more similar to a New Scientist article than standard academic prose?

And if so, what are the minimum conditions for a paper to be a paper?

[quantum_jim](#)

The main condition is that there is a paper is on the arXiv. If the arXiv pdf is an introduction or documentation of a software project, and refers for example to a GitHub repository, I do not see a reason why it should not be allowed.

Regarding style: while authors are free to write articles in their favourite format, we strongly discourage overselling of results. As long as this doesn't happen, the presentation is clear and the project is well documented throughout, it should have a chance to be peer reviewed. In the end it boils down to whether one can find referees willing to review it.

Something else: the final accepted version that is assigned a DOI should refer to a specific version of the work. ~ *Lidia*

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Quantum will be less restrictive here than many established journals. Quantum will in principle publish works ranging from long technical papers to short letters outlining an innovative idea to reviews articles. Still, a textual description original research or a review of previous research that is useful for scientists working in the area will be considered the core contribution of any submission to Quantum. To cite our [Editorial Policies](#): "For original research, either a very significant technical or conceptual contribution or a nice combination of both is necessary for acceptance in Quantum." At the same time, we put a lot of emphasis on the quality of the presentation. We [ask our referees](#) the following questions about a submission: "Is it well written? Are the main results clearly laid out? Does the manuscript clearly describe assumptions and limitations?" Our editors will not accept unless these can be answered in an affirmative way. The scientific core of a submission can then be augmented by material aimed at a broader readership such as a popular summary, a video abstract, or even interactive content that we can link to from the papers page on our website. *Christian*

How do you respond to videos (such as Veratasium) that talk about how research can be incredibly inaccurate and how do you plan on preventing that from happening?

[u2berggeist](#)

Ensuring the correctness (of verbal statements and mathematical proofs) and the reproducibility of numerical simulations and experiments is a difficult problem with no simple and fully satisfactory solution. We had a long and very interesting community discussion on the issue of [open data](#) highlighting the complexity of the issue (we will explain more what we took from that in an upcoming blog post). Naturally, referees and editors will spend much less time reviewing a paper than the authors spend producing the results and writing them up. For experimental works, they will not be able to gain the same deep knowledge about the inner workings of a complicated experiment as the authors who spend years building the machine. It is unrealistic to expect that a referee will always be able to, for example, find a subtle misunderstanding by the authors of a result they cited from another paper, or to identify a particular faulty cable as the reason for an unexpected bump in a plot of experimental data. Ultimately, for the assessments of correctness we have to put some trust in the referees, editors, and authors. What a journal can do, it put reasonable policies and mechanisms in place that make it less likely that false results slip through. Quantum highly discourages overselling of results and instead wants works that clearly state their limitations. Quantum has editors who are themselves experts in the field and who can thus better judge the correctness of the presented results and know whom to ask for an informed referee report. Further, Quantum encourages the open publication of data and source code, and asks for a [detailed description of procedures and methodology](#). *Christian*

It will probably take a little bit of time to converge on the right level of selectivity. How will you know when you have reached that level? Do you expect the journal to become more selective over time, or

do you expect it to stay constant?

[mabuchi](#)

This is something that cannot be guessed *a priori*, and we may need to adjust over time. However, the core selectivity criteria should not change: Quantum puts scientific quality, significance, and clarity of presentation first, as expressed in our [editorial policies](#).

We have great trust in our [editorial board](#), and we have some tools in place to promote a consistent selectivity level over the different topics covered by the journal. For example, editors are encouraged to discuss borderline cases amongst themselves, and to share their conclusions with the entire editorial board. ~ *Lidia*

How exactly did you put all this together?

I would love to set up a similar journal for theoretical/computational Condensed Matter Physics as I feel there is a niche here that is unfilled, but it seems like a whole lot of work without knowing if anyone will actually submit to the journal when its ready.

What plan do you have to get the journal going? I imagined asking a lot of the big-names in the field to guest-edit special issues to get the name out there.

Also what kind of impact factor are you aiming for?

[AmateurLobster](#)

We plan to write a short guide to how to put all of this together once the first publications are out. The idea is precisely to help researchers in other fields to launch this kind of journal.

From the beginning we knew that if we wanted this project to succeed, we needed to involve the whole community. First we drafted the initial vision for the journal (and here it's like any startup: it is important to have a small core of committed people who share a vision and bring in different skills).

Then we invited twelve senior researchers in quantum science to form a [Steering Board](#) who has all the decision power. We prepared the [website](#) and social media pages, and from very early on we encouraged [public discussions](#) on things like the [editorial policies](#) of the journal. We also discussed the ideas behind the journal in person with essentially everyone we knew. We launched an [open call for editors](#), which had over 130 applications and allowed the Steering Board to chose 40 excellent editors.

Other important factors: We officially set up the journal as a [non-profit organization](#). We looked for great technological solutions, like [Scholastica](#), to manage logistic aspects efficiently. We asked several institutions for initial funding, and set up a [donation page](#). We presented the journal at conferences (for example via posters or short talks). ~ *Lidia*

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Setting up and running this journal was and still is a lot of work. What we did, before we seriously got into this, was to talk to many colleagues to see if the field was ready for what we had in mind. Once we saw that there was a wide-spread dissatisfaction with how publishing currently works, we started looking into whether it would be technically feasible to set up a journal with reasonable effort. Existing technology, like the platform of [Scholastica](#) to organize the peer-review process and modern web development tools like Wordpress, make this feasible even for a small team. Having convinced ourselves that there was a need for a journal like Quantum and that it would be technically feasible, we started approaching widely respected researchers in the field with a document we called the "pamphlet" - a kind of cross-over between mission statement and business plan - asking for feedback and whether they would want to be part of this endeavor, gradually making the aspects of the plan more concrete based on their feedback. We got a lot of support and people were generally enthusiastic. We gradually widened our scope, increasing the circle of such senior advisers, and they now form our [Steering Board](#). Once we had developed a concrete vision, we put this up for discussion with the wider community on [/r/quantumjournal](#). To get people involved, a good design and social media strategy were crucial. We do plan to elaborate on the making of Quantum in blog posts on our website in the future, because we do want to encourage others to copy this model. Concerning the impact factor I can say that according to our [Editorial Policies](#), the expected impact of a work shall not influence the editorial decision. Quantum will be selective, but it will not select on high impact. It is however the hope that by selecting on the scientific quality and accessibility of works a comparably high impact will come as a corollary. If you want to read more about our understanding of scientific quality, I would like to refer you to [our blog post on selectivity](#), in which we discussed and summarized the outcomes of a community discussion on [/r/quantumjournal](#). *Christian*

This is going to come off as rude or stupid or profiting But, How do you plan to maintain the costs of this publishing method? While i agree that allowing a greater access to data and research is ultimately better for science. But quantum computing and reasearch is not cheap. There are inherent costs associated to reasearch. And you all need to pay for food and housing and everything else. Do you plan on this being a collective charitable contribution to this method of distribution with you earning livings in other areas? Or will you somehow find a way to cover the base costs of this work?

[Kondrias](#)

Quantum is run by a non-profit organization. Like all other contributors, we are working for free to make this happen. At the same time, we are earning our living as active researchers in quantum science. *Christian*

What do you think of arXiv? While not a journal, it is used like one in fields like particle physics.

[mfb-](#)

We love the arXiv. It has become an essential tool in rapid and open dissemination of research. It fulfills a different role than journals, because it doesn't have the peer review aspect to it (up to basic checks). That's where journals like Quantum come in.

To ensure that research is always openly available, we require that papers submitted to Quantum be published on the arXiv. After our peer review process, the final accepted version of the paper must also be uploaded to the arXiv.

Would a fair description of the journal be a voluntarily peer-reviewed arXiv quant-ph? (do not mean

that to sound dismissive or anything).

[EngSciGuy](#)

A volunteer-run peer-reviewed online journal for papers posted on arXiv quant-ph would be a fair description.

Would a fair description of the journal be a voluntarily peer-reviewed arXiv quant-ph? (do not mean that to sound dismissive or anything).

[EngSciGuy](#)

That is indeed the basic mechanic.

James

I guess I have a question: How 'significant' should the papers you are going to accept be? Is it PRA level, PRL, Science, Nature?

I ask because I'm not sure what to submit there (I have at least one future paper in mind). If you accept papers which are technically correct and in the correct field, but low impact/significance, then maybe I would be better off submitting to a higher impact, more established journal (even though they might charge more, or not be open). On the other hand, if you require higher impact then perhaps the paper I have in mind might not meet that requirement.

[nopaniers](#)

We discuss the selectivity criteria of Quantum in detail on [this blog post](#)

In short, Quantum will be selective:

There are plenty of both traditional and open-access journals that have very low bars for acceptance apart from correctness, with varying quality of peer review. It is in the realm of selective journals that more alternatives are needed and where Quantum can distinguish itself by promoting a different incentive structure and editorial policies.

This part is also relevant:

Aiming for high quality standards does not mean that Quantum is trying to beat traditional publishers at their game. Quantum will still have different acceptance criteria than other journals. Quantum will never ask referees or editors to judge the impact of a paper. Referees are guided through specific questions to judge the quality of the paper, and the editor should be an expert in the subject. Quantum will publish negative results as well as technical results of interest to small communities, and focus on clarity, correctness and reproducibility.

Quantum will not have broad interest as a strict requirement, like the Physical Review Letters, nor the emphasis on cross-community research of Physical Review X. There will be many papers that fit better into some of the established journals, and Quantum is aiming for peaceful coexistence and healthy competition with them.

In addition, Quantum is by nature very different from commercial publishers: Quantum does not want to sell a product and cannot make profits. Quantum's ruling body is a steering board composed only of active researchers. It is set up as a non-profit and designed to serve the community.

Does this help? ~ *Lidia*

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This point was debated on [/r/quantumjournal](#) a couple of months back. See [here](#). The end result in terms of policy was set out in [this blog post](#).

James

What are your thoughts on the Penrose-Hameroff quantum microtubules theory for a biological agent of consciousness? Do you believe quantum mechanics will have a part in uncovering the nature of consciousness?

[greatness awaits](#)

You might have better luck asking this on [/r/quantum](#). Though you probably won't have much luck anywhere, I'm afraid.

Questions here are more aimed at how science should be disseminated through publications.

James

How does Quantum ensure reliability within the journal?

[shammazah](#)

Can you be more specific about what you mean with reliability and which part of the journal you are referring to? *Christian*

Are you in anyway engaged with [SciPost](#)?

Also arXiv overlay, also by researchers for researchers. But they allow reviews from anyone next to invited reviews.

[tagaragawa](#)

SciPost and Quantum were developed in parallel and independently. We are supportive of the idea, but are not actively engaged in SciPost. *Christian*