

EPL: 40 Years as Your Letters Journal

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With a palpable sense of breathless urgency, an announcement headed “Your Letters Journal” appeared in the June 1985 issue of *Europhysics News* [1] to herald the birth of *Europhysics Letters* – a journal that belongs to the international community of physics researchers. Forty years on, we at EPL (as it is now called) thought it appropriate to pause and reflect on the unique qualities that deliver on this initial promise.

Independent, not-for-profit

With the rise of the internet and a multiplicity of new channels for disseminating scientific research, scientists are increasingly debating the question of who owns and controls these outputs. Already in 1985 the European Physical Society (EPS) had an answer to this question, made concrete through the ownership and governance structure of its fledgling journal.

“The coownership governance model of EPL (*Europhysics Letters*) – originally created by and today shared by multiple European physical societies – offers a strong advantage in serving the physics research community by aligning the journal’s strategic direction with the collective interests of the discipline. This structure ensures editorial independence, scientific breadth and community trust, as the journal’s strategy is shaped by a diverse set of learned societies representing different subfields, geographies and research cultures. It also reinforces EPL’s mission to prioritise scientific quality and rapid dissemination, while enabling reinvestment of surpluses back into the community through society activities.”
– EPLA Board of Directors

Although the details have changed over the years, a single common thread runs throughout: partnership. At present, the journal is directed by the not-for-profit EPL Association, with the European, Italian and French Physical Societies and the UK’s

Institute of Physics as the major partners. A further thirteen national physical societies are also represented on the EPLA Board of Directors.

The European dimension

The integrity of the scientific record has also come under intense scrutiny over the past four decades. At EPL, this integrity is assured by sitting under the scientific direction of the EPS, responsible for the appointment of the Editor-in-Chief and the editorial board members who handle manuscripts. It is this collective effort that the Euro- prefix in the journal’s original name was intended to signify. The journal has always served the entire international physics community, and today over half of the published *Letters* originate from China, India or the United States. In rebranding as EPL in 2007, the journal further affirmed its position as a globally trusted venue for high-quality research.

By scientists, for scientists

EPL publishes letters across all topics in physics, and right from inception the journal has taken the view, articulated in the aphorism attributed to George Marx, that physics is what physicists do. Vital in keeping this spirit alive is an editorial board that is drawn from the same body as the journal’s authors and readers: practising research physicists. At EPL, members of the editorial board are called Co-Editors, this unusual term reflecting the partnership they form in asserting the scope of the journal and maintaining high scientific standards through rigorous peer review. We are furthermore guided by our experiences as authors and reviewers, acting with the professionalism and integrity we expect of editors when performing those other roles.

We refresh the editorial board annually, and with an upper limit on any Co-Editor’s maximum term, the journal continually moves the times and remains relevant. Three Deputy Editors assist the Editor-in-Chief in strategic matters and in commissioning the journal’s unique series of Perspectives, these being brief, accessible points of view on research at the frontiers of physics.

“What makes EPL special is that it is run by scientists and supported by an Editorial Office who know and understand our community with all its quirks! These staff are astoundingly efficient and possess an encyclopaedic memory of relevant interactions in EPL history; their advice is always timely (and good-humoured!) and their role indispensable even, or perhaps especially, in the age of artificial intelligence.” – Rosemary Harris, Deputy Editor

“I would highlight the Perspectives series: the fact that these are commissioned from a curated list of researchers and that invited authors are given genuine leeway to offer a personal point of view rather than a conventional review.” – Pablo Corngaglia, Deputy Editor

“EPL has a team of Co-Editors that is outstanding in its number, variety and quality; this allows EPL to competently cover virtually all areas of physics and ensure a fair and efficient refereeing process.”
– Dario Benedetti, Deputy Editor

The personal touch

With an editorial board spread across the globe, operating in different time-zones and around their other scientific activities, much precise coordination is required. Following submission, a paper's journey begins at the EPS Editorial Office in Mulhouse, France, and after careful checking is presented to a qualified Co-Editor for consideration. The Editorial Office staff keep editors, reviewers and

"For me, EPL has always stood for a particularly productive combination of qualities – high standards, intellectual openness, and opportunity. It is an ideal home for innovative physics: work that is technically strong, fresh in its perspective, ambitious in its implications, and capable of stimulating activity across established boundaries. Serving as a Co-Editor of EPL places one at the very heart of scientific development, close to the questions, methods, and emerging results that matter most. It is like having one of the finest seats in the theatre of science, seeing important discoveries before they formally enter the literature."

– Matjaž Perc, Co-Editor 2015-22

"I like that EPL really goes for great novel physics and creative ideas rather than looking at potential citation rates of an article after acceptance. Being a Co-Editors gives bright young people a chance, at the same time supported by very established senior scientists."

– Christian Beck, Co-Editor 2015-21

"The motivation, in part, for the creation of EPL was as a European counterpart to PRL. It still served that function when I was a Co-Editor: PRL was still seen as the place where large collaborations, particularly in particle physics and astronomy, published their results, and EPL seemed more attuned to those of us not working in these areas and carrying out theoretical work. This was especially true in my area of statistical mechanics."

– Alan McKane, Co-Editor 2011-14

Editorial Process



authors informed throughout the review process. Accepted papers pass to the SIF Production Team in Bologna, Italy, for copy editing and typesetting before being published by IOP Publishing in Bristol, UK.

It is crucial that we hide the complexity of this process from authors as much as possible. To see if we succeed, we have started gathering feedback from authors of accepted manuscripts [2]. Figure 1 shows that this is overwhelmingly the case: 89% of respondents find EPL's editorial process superior to that of other physics journals. This appreciation is echoed by the authors

▲ FIG. 1: Infographic arising from the author feedback survey.

"With its dedicated Editorial Office, EPL offers a premium service to authors and reviewers. Supported by highly active Co-Editors and an engaged leadership team, we provide a personalised publishing partnership. Join the EPL family to experience it!"

– Frédéric Burr, EPL Staff Editor

▼ FIG. 2: An EPL article featured in *Physics World*.

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Loop quantum cosmology may explain smoothness of cosmic microwave background

Repulsive gravity at the quantum scale would have flattened out inhomogeneities in the early universe

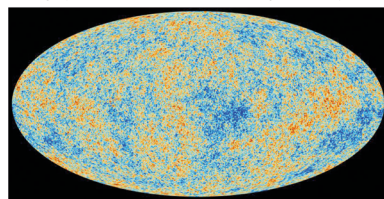


FIG. 1: The cosmic microwave background, as imaged by the European Space Agency's Planck mission.

In classical physics, gravity is universally attractive. At the quantum level, however, this may not always be the case. If quantum fluctuations of matter are present within an inflationary bubble – at the centre of a black hole, for example, or during the very earliest moments of the universe – space-time becomes curved and stretched beyond the Planck length. This is the fundamental quantum scale of distance, and it is around 10^{-35} metres. In these extremely curved regions, the classical theory of gravity – Einstein's general theory of relativity – breaks down. However, recent loop quantum cosmology offers a possible solution. It suggests that gravity, instead of being purely attractive, can also be repulsive. Consequently, loop quantum cosmology predicts that our present universe began in a so-called 'big bounce', rather than the Big Bang singularity predicted by general relativity.

In a recent paper published in *EPL*, Edward Wilson-Lewy, a mathematical physicist at the University of New Brunswick, Canada, explores the interplay between loop quantum cosmology and a phenomenon sometimes described as 'the echo of the Big Bang': the cosmic microwave background (CMB). This background radiation pervades the entire visible universe, and it stems from the moment the universe became cool enough for neutral atoms to form. At this point, light was suddenly able to travel through space without being continually scattered by the plasma of electrons and light nuclei that existed before. It is this freely travelling light that makes up the CMB, so studying it offers clues to what the early universe was like.

What was the motivation for your research? One vision of the CMB shows that the early universe (that is, the universe as it was when the CMB formed) was extremely homogeneous, with relative anisotropies of the order of one part in 10^5 . Classical general relativity has trouble explaining this homogeneity on its own, because a purely attractive version of gravity tends to drive things in the opposite direction. This is because if a region has higher density than the surrounding area, then according to general relativity, that region will become even denser: there is more mass in that region and therefore particles surrounding it will be attracted to it. Indeed, this is how the small inhomogeneities we do see in the CMB grew over time to form stars and galaxies today.

The main way this gets resolved in classical general relativity is to suggest that the universe experienced an episode of super-rapid growth in its earliest moments. This super-rapid growth is known as inflation, and it can suffice to generate homogeneous regions. However, in general, this requires a very large amount of inflation (much more than is typically considered in most models). Alternatively, if for some reason there happens to be a region that is moderately homogeneous when inflation starts, this region will increase exponentially in size while the surrounding further homogenizes.

It is important to extend this work in several directions to check the robustness of the homogenization effect in loop quantum cosmology



Edward Wilson-Lewy, author of the paper.

wide range of initial conditions. From this, I found that while homogenization doesn't occur everywhere, it does occur in some regions. These homogenized regions can then be blown up to cosmological scales by inflation (and inflation will further homogenize them). Therefore, this quantum gravity homogenization process could indeed explain the homogeneity observed in the CMB.

What do you plan to do next? It is important to extend this work in several directions to check the robustness of the homogenization effect in loop quantum cosmology. The restriction to spherical symmetry should be relaxed, although this will be challenging from a mathematical perspective. It will also be important to go beyond just a description of matter. The simplicity of that makes calculations easier, but it is not particularly realistic. Other relevant forms of matter include radiation and the so-called inflaton field, which is a type of matter that can cause inflation to occur. That said, in cosmology, the physics is to some extent independent of the universe's matter content, at least at a qualitative level. This is because while different types of matter content may dilute more rapidly than others in an expanding universe, and the universe may expand at different rates depending on its matter content, the main properties of the cosmological dynamics (for example, the expanding universe, the occurrence of an initial singularity and so on) within general relativity are independent of the specific matter being considered.

Therefore, one can reasonably expect that the quantitative predictions will depend on the matter content, but the qualitative features (in particular, that small regions are homogenized by quantum gravity) will remain the same. Still, further research is needed in particular that small regions are homogenized by quantum gravity will remain the same. Still, further research is needed to test this expectation.

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www.epljournal.org
This article was written by Physics World as part of the EPL 50th anniversary celebration. Read more on physicsworld.com.

"The partnership with Physics World was a valuable opportunity to have my research highlighted, and as a result my research article received a lot more attention, especially from a more general audience, than it would have otherwise. I was told there were over 2400 page views after 5 days of going live and I imagine that number has grown since then."

– Edward Wilson Ewing, EPL Contributor and current Co-Editor

"It was exciting to see a scientific paper become podcast. It was our first such experience, and it was a success. The pleasant informal chat we had with Margaret Harris was magically turned into a piece that was listened to by thousands... It amplified the reach of our work and reinforced our intention to stimulate curiosity in ecological applications of statistical physics."

– Silvia De Monte and Ada Altieri, EPL Contributors

"We had a very fruitful interaction with science journalist Margaret Harris at Physics World about our research on airborne wind energy which was instrumental in highlighting broader implications."

– Antonio Celani, EPL Contributor

"Describing my work on epidemics and pandemics was a really nice opportunity

to communicate to a broader physics audience. I think it is a great idea to do these pieces that is another level of science dissemination, somewhere between a paper for technical specialists and lay public communication, which necessarily is somewhat 'dumbed-down'."

– Bhavin Khatri, EPL Contributor

"I had an extremely positive experience with EPL and Physics World. We discussed our invited Perspective on animate droplets on a Physics World podcast. This collaboration was very professional and was an effective and fun way to amplify our scientific ideas and their reach beyond the traditional journal format."

– Giorgio Volpe, EPL Contributor

"I've been impressed by the enthusiasm of the EPL authors I've worked with as part of the EPL/Physics World sponsored content programme. They're truly excited not only about the science they're doing, but about the prospect of communicating that science with people in the wider physics community. At a time when scientific research is under increased pressure from many directions, this is particularly important and refreshing to see."

– Margaret Harris, Online Editor, Physics World

Physics World (coincidentally also published by IOP Publishing) as our partner to showcase treasured highlights [5]. Here we don't merely communicate cutting-edge science in a more accessible way. We also go behind the scenes to glimpse into human aspects of research that are often overlooked: where the inspiration came from, what was involved in doing the work and where the field is going.

To the next forty years

In drawing together this reflection of EPL's special place among physics journals, one thing has become abundantly clear. The journal succeeds not just because of the high quality of the published research, but because of the support and commitment to our values from the community that sits behind it. You might be aware from recent announcements that a new chapter in EPL's history is about to open, with production and publication of accepted manuscripts being taken over by OUP. Our experience in working in partnership with organisations that share our values promises a smooth transition for all of us involved with EPL. ■

References

- [1] "Europhysics Letters: Your Letters Journal", *Europhysics News* 16(6), 1 (1985)
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- [3] EPL 40th Anniversary Highlights, <https://iopscience.iop.org/journal/0295-5075/page/40-anniversary-highlights>
- [4] EPL 25th Anniversary retrospective, *Europhysics News* 42(4), 16 (2011) <https://epn.eps.org/epn-42-4/#18>
- [5] Highlights of EPL: Research in the Spotlight, <https://physicsworld.com/p/highlights-of-epl/>

▼ FIG. 3: A selection of EPL covers from 2010 to 2019, illustrating a decade of scientific diversity.

we have reconnected with during our anniversary year as we revisit highlights from the decade 2010-19 [3], this bringing us up to speed with developments since our 25th anniversary retrospective [4].

Reaching a wider audience

As part of our service to the community, EPL is now bringing our authors' research to audiences beyond our immediate readership. After careful deliberation we selected

