

# How do we address the many facets of the nuclear debate?

**François Graner**, physicist, National Center for Scientific Research (CNRS), and **Stefano Matthias Panebianco**, physicist, Atomic Energy Commission (CEA), editors of this issue

## A divisive subject

The story of how this special issue of *Reflète de la Physique* came about is long and tortuous. It began with the realization that nuclear power is probably the subject which most divides the physics community. Hence the initial idea, admittedly not a very original one, was to offer the readers of *Reflète* a short article on civil nuclear power in France; scientists with opposing views on the subject would be invited to contribute. We wanted to present the debate in a way that was both concise and comprehensive, but we soon realized that it is impossible to do justice to such a complex and multifaceted subject in just a few pages.

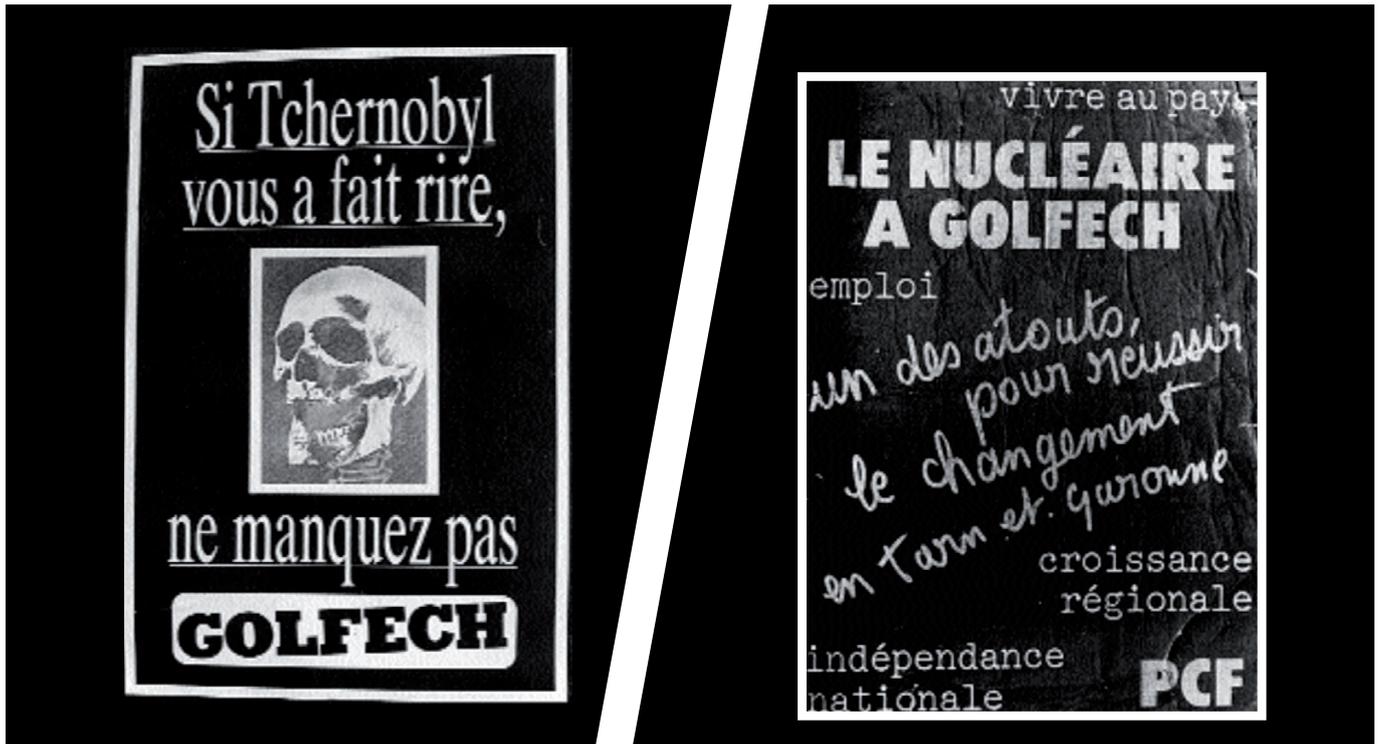
The magazine's editorial board was convinced of the value of addressing the ongoing debate about civil nuclear power. They asked us to coordinate the publication of a special issue dedicated to this subject which would focus on the present-day use of nuclear fission to generate electricity in France. It has taken authors and editors two years to agree, implement and collate this collection, guided by a number of considerations, discussed below.

## What will you find in this issue?

First of all, which subjects should we tackle? It is clear that the issue of power generation is the subject of intense public debate, both in France and the rest of the world. The physics, the environment, the economy and politics are inextricably linked. Any decision taken individually or collectively involves weighing up several factors and for each individual certain aspects carry more weight than others. It was obvious from the outset that, along with the more technical aspects, we would need to include insights into some areas you might not expect to find within a physics magazine.

In fact scientists, and physicists in particular, were invited into this debate, sometimes with a bit of arm-twisting, and often with views that go beyond their field of expertise. However, scientists are first and foremost citizens, inhabitants of the planet and, as such, participate in the energy choices that have an impact on it. Within this framework, physicists could hopefully apply their typical working methods, relying on critical and reasoned analysis, to express their opinions within the context of a controversial debate.

This is why you will find four types of articles in this issue. Firstly (p. 6), some factual articles on the uranium industry and French nuclear power plants, nuclear waste and plant decommissioning. Secondly (p. 16), to set the scene for the ensuing debate, articles on the environmental impact (in the broadest sense) of nuclear power under normal operating conditions, on the risk of accidents, on the control of radioactivity, subcontracting and the costs of nuclear power. Thirdly (p. 32), to put the debate in its historical context, articles on the history of civil nuclear power in France and its military origins, analyses of the relationship between nuclear power and society, and the treatment that the press gives this public debate. Finally (p. 44), we look to the future: what scenarios can be envisaged on a global scale, in terms of climate, or on a national scale, as a result of choices made by society? What technical or political decisions concerning electricity distribution networks and research avenues will come to influence the debate?



Translation: If Chernobyl made you laugh, don't miss Golfech.

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## Who are the authors?

Evidently, given the diversity of themes explored in this issue, the selection of the authors has been a crucial step. The main criterion was to represent a broad range of perspectives, so the various contributors are as representative as possible in terms of fields of expertise, including physics, mathematical modelling, ecology, security, economics, history, non-governmental organizations, geology, chemistry, journalism and politics. The opinions of each author are validated by his or her expertise and their relevance to the subject matter, and not by his or her institutional affiliation. All the authors are French or work in France; addressing issues of international interest could, in the future, enrich the debate.

Some authors are known to publicly express a « pro- » or « anti- » point of view; it was deemed necessary to include such opinions where justified by relevant arguments. It has been our role, as editors, and that of the editorial committee, to ensure the reliability and coherence of what is conveyed and to ensure balance in order to provide the authors with a forum for a genuine and fair debate, so that innovative and positive aspects can

emerge alongside the most intractable problems. Illustrations also help to maintain a balance between opposing views (see example above).

## And finally...

Despite the rigor of the process, there are some lingering frustrations. Many aspects that were touched on only slightly or not at all in this issue deserved much more in-depth study; the final article (p. 58) is dedicated to these aspects, with the aim of highlighting that such a rich and complex debate is far from being exhausted by a sixty-page document. And, despite everyone's efforts to make it interesting and readable, the sheer amount and density of information in this issue could discourage the usual reader of the magazine.

The document that you, the reader, have in front of you, is the result of a great deal of work by the authors, whom we warmly thank for their perseverance and patience, as well as an editorial process of which we are proud. We hope that it offers as clear and up-to-date an understanding as possible of the very many implications of the use of nuclear energy, its development and its possible

future. We hope that it will provide food for thought and enable people to make an informed opinion in the context of an engaging and emotive debate, and that it encourages them to go beyond black and white thinking and instead to appreciate the numerous aspects and subtleties of this controversial topic. ■

*This is the translation of a French work published in December 2018. We have not attempted to adapt it to a more international context, nor to translate the bibliography. We hope that the questions it raises, the style of debate it introduces, and the elements drawn from the French specific context can inform the debate in any other national context.*

Complete issue can be downloaded at:  
[www.refletsdelaphysique.fr](http://www.refletsdelaphysique.fr)

For questions or comments,  
 please contact: [sfp-bulletin@ihp.fr](mailto:sfp-bulletin@ihp.fr)

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