Subsequent chapters are devoted to the characteristic problems that arise with increasing numbers of nucleons. The authors discuss at length methods for how to extract phase shifts on the lattice for two and three nucleons, and they carefully weigh the advantages and disadvantages of the Luescher, spherical wall, and auxiliary potential methods. Increasing the number of nucleons beyond three, as the authors show, creates the need for Monte Carlo sampling of lattice calculations. The last chapters move up to medium-mass nuclei and to chiral forces up to next-to-next-to-next-to-leading order. The authors report on some of the first attempts to solve these thorny problems, but they acknowledge that actual solutions are still in the future.

Lattice methods are technical and beset by a cumbersome mathematical apparatus. Thus any explanation of them could be difficult to read for outsiders or newcomers to the field. However, Lähde and Meißner manage to get the complex material across in a digestible way by breaking it up into small steps and knowing when repetition is helpful. They also introduce from scratch such basic concepts as phase shifts, without referring the reader to another book. Such care makes *Nuclear Lattice Effective Field Theory* self-contained, which is a great practical advantage to the reader. The six appendices further enhance the self-contained character of the text by summarizing notations and conventions and providing more details about useful mathematical functions, nuclear force properties, and the application of Monte Carlo methods.

Nuclear Lattice Effective Field Theory offers interesting insight into the endless problems that the pioneers of lattice methods had to confront during the past 20–40 years, such as rotational symmetry breaking, the sign problem, and the unfavorable scaling of Monte Carlo algorithms. Solutions have been worked out for most hurdles, and thus we can say that nuclear lattice EFT has come of age; the field is ready for more comprehensive and systematic applications in nuclear theory.

Apart from work by some of the authors' collaborators, the method has not yet been applied widely in nuclear theory. Lähde and Meißner's helpful primer has the potential to stimulate increased efforts by serving newcomers as an essential guide to the field.

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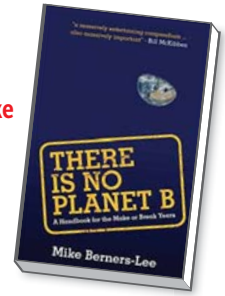
The challenges and opportunities of the climate crisis

There Is No Planet B

A Handbook for the Make or Break Years

Mike Berners-Lee
Cambridge U. Press, 2019.
$12.95 (paper)



People are causing Earth's climate to change and climate changes create serious risks for humanity. We have a wide range of well-studied response options, and the expected benefits from many of them greatly exceed the expected costs. Those conclusions result from multiple independent lines of evidence and have been reaffirmed by hundreds of comprehensive scientific assessments. Subject-matter experts examined the evidence, independent scientists reviewed the findings, and scientific organizations stood behind the processes and outcomes. I am not aware of any scientific institution with relevant subject-matter expertise that has looked at the evidence and reached contradictory conclusions.

Despite the robustness of those scientific conclusions, we continuously fail to respond to climate change. We struggle even to have an effective public conversation about whether to respond and, if so, how. That may be the most ominous implication of climate change—that our social institutions aren't up to the task of addressing major issues, even when we have unambiguous scientific information in favor of doing so.

But climate change is, possibly, also an opportunity. If we figure out how to approach our climate problem, we might create a template for addressing a wide range of challenges and opportunities facing humanity in the 21st century. That is the key insight and basic premise of Mike Berners-Lee's book *There is No Planet B: A Handbook for the Make or Break Years*. It's a terrifically important idea that may be the key step in the pathway toward humanity's future.

Berners-Lee emphasizes that climate

change is one of several global social and environmental changes that are currently underway. Additional examples of global environmental changes are the loss of biodiversity and the redistribution of species throughout the world, stratospheric ozone depletion, land conversion, and nutrient deposition. The climate problem is thus both hugely important on its own and reflective of a bigger challenge: Our increasing capacity to disturb the planet means that we need new and better ways to work together and to harness human ingenuity. Addressing climate change could show us the way to tackle the larger set of issues that we face.

There Is No Planet B will resonate most with those who are already deeply focused on the climate system, the impact people are having on it, and our path forward. Unfortunately, the book largely misses the mark for a broader audience. Although it identifies the critical issues, the discussion of them is too often weak and underdeveloped.

The book's approach to discussing social values illustrates some of its shortcomings. Berners-Lee emphasizes that he is trying to initiate a conversation and that he hasn't figured it all out. That is the right idea; we will need to have an open discussion in which everyone has a chance to participate and learn from one another.

But Berners-Lee asserts the need for particular values instead of leading a critical examination of the options and their implications. That is a mistake. Ultimately, individuals and societies must determine which values they adopt. No one person can set them. By championing values at the outset, *There Is No Planet B* misses the opportunity to encourage and empower readers' exploration of societal values. It becomes too easy for readers to reject the book's espoused values and to uncritically stick with their own.

For example, Berners-Lee asserts that a commitment to equity is central to solving climate change. That view generally resonates with me, but it would be more compelling as a conclusion that follows from a hard exploration of alternatives and the potential futures those alternatives imply for humanity. As offered, Berners-Lee's assertion is unlikely to impact any preexisting beliefs that readers have.

The challenges we face are daunting. Climate is a critical life support system, and we have no reason to conclude that it will be resilient against the massive disturbance to which we are subjecting it. None of us acting alone is likely to solve the problem; we will have to work together. That interdependence makes climate change hard for individuals to face.

But we are also awash in good news. Science has provided us with remarkable insight into how the climate system works, the impact that people are having on it, and the ways that we can respond. Even better, if we get our approach to climate change right, then humanity will be poised to continue our remarkable run well into the future. *There Is No Planet B* may not be able to get us to that potential future, but it provides a hint of what we will need.

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