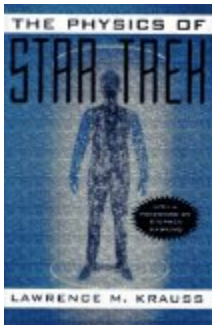
H-Net Reviews
in the Humanities & Social Sciences

Lawrence M. Krauss. *The Physics of Star Trek.* New York: Basic Books, 1995. xvi + 188 pp. $20.00 (cloth), ISBN 978-0-465-00559-8.



Reviewed by Anne Collins Smith (Austin Community College)
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Science vs. Star Trek or the Science of *ST*?

When I got my review copy of *The Physics of Star Trek* by Lawrence M. Krauss, I suddenly got cold feet. According to the jacket, Dr. Krauss holds an endowed chair in physics, is chairman of the physics department and is also a professor of astronomy at Case Western Reserve University. The list of his awards and achievements rivaled Captain Kirk's service record, and I wondered if I was in over my head. As an instructor of philosophy and humanities, with little more than a high school background in science, I doubted my ability to understand a work written at Dr. Krauss's level of expertise.

To my surprise and delight, I found that I was *exactly* the sort of reader for whom the book was written! The book, which uses clear, simple explanations with plenty of examples and illustrations, is aimed at an audience with only a basic knowledge of science–and, of course, a familiarity with *Star Trek*.

Krauss's approach is straightforward: he examines the advanced technology proposed as part of the *Star Trek* universe in terms of our current understanding of the physics involved. He begins by considering the *Enterprise's* inertial dampers, which leads naturally into a discussion of the forces of gravity and acceleration. He moves on to more complex issues such as time travel, warp drive, and alternate universes. In the course of examining these *Trek* phenomena, he manages to impart a good deal of easily digestible information about the interrelationship of space and time and the physical laws that govern their interaction at both the macro and the micro levels.

In addition to stating and explaining the physics behind the fiction, Krauss presents brief histories of scientific progress as relevant to the subject at hand. For example, he traces the present understanding of the interconnection of space and time back to the discovery of the relationship between electricity and magnetism made in 1864 by James Clerk Maxwell (who was building on prior work by Ampere, Couplomb, and Faraday) and to Maxwell's further conclusions about electromagnetic waves and the nature of light. Then Krauss moves forward, through experiments by A. A. Michelson and Edward Morley, who attempted to discover a medium through which light is transmitted, to Einstein's brilliant insight that space and time become relative as one approaches the speed of light. This kind of historical progression presents science as dynamic rather than static, and is in keeping with the forward-looking project of making sense of the physics of the fictional twenty-third and twenty-fourth centuries: seeing how science has moved forward in the past makes it easier to understand how it might proceed in the future.

Krauss does not rule out possibilities based on our present limitations; instead, he speculates about the conditions necessary to bring about such technology in the future. In this process he makes some careful distinctions. For example, he distinguishes between *Star Trek* phenomena that are theoretically possible according to our present understanding of physics, such as the existence of wormholes; those which appear to be theoretically impossible, such as the "slingshot effect" as a method of time travel; and those whose feasibility cannot

yet be determined, such as warp drive. He is also quite clear about when he is stating accepted scientific theory and when he is presenting his own interpretations or arguments.

The book closes with a brief chapter that *Star Trek* devotees will find amusing: Krauss describes his ten favorite physics blunders committed in various episodes. The book also has a good index that includes topics, scientists, and *Star Trek* episodes.

I can think of three uses for *The Physics of Star Trek*. The first is simply as light reading. This book is an excellent type of leisure reading: not only is it fun and entertaining, but it effortlessly informs and enriches the reader.

A second use would be as a textbook in a "light science" course for non-majors, preferably accompanied by the occasional showing of excerpts from relevant *Star Trek* episodes. In my experience, students take these "physics for poets" classes because they have to take some kind of science, which they often resent; in addition, some suffer from a kind of "science anxiety," much like students who fear math classes. This book's lively style will engage even reluctant students, and although some students may fear science, they generally find *Star Trek* familiar and non-threatening. I myself have had some success using *Star Trek* episodes to introduce difficult philosophical topics such as the mind/body problem; I can easily see a parallel use in such a science course.

Finally, this would be a useful source book for a scholar working in the interdisciplinary field of the relationship between science and fiction. Although it is not one of the main points of the book, Krauss gives a number of examples of the interaction between science and science fiction. He mentions such stories as the *Next Generation* episode "The Loss," whose plot is driven by the appearance of a cosmic string fragment; and he cites scientific investigations conducted in an effort to explore the possibility of various *Star Trek* devices, such as the theoretical proofs developed by physicist Miguel Alcubierre relating to the conditions required for the use of warp drive.

This is a delightful book that I would recommend without hesitation to anyone familiar with *Star Trek*.