

**The Living Cosmos: Our Search for Life in the Universe** FREE

Eric Chaisson



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ably dejected and probably quite angry" (page 167). Freund learned about that uncharitable story from his friend, the late Subrahmanyan Chandrasekhar. Anybody familiar with the amiable young Einstein would doubt this version. There is also clear evidence that the snub never happened, and Freund admits that in a commentary at the end of his book. But why include such nonsense in the first place?

The text does contain some minor errors, such as misspellings of Chandrasekhar (page 206), Nordström (page 208), and Ehrenfest (page 209). There are more doubtful stories—and many funny ones—in Freund's book, mostly well told. Freund wrote *A Passion for Discovery* not just for physicists but also for a larger audience.

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## The Living Cosmos Our Search for Life in the Universe

**Chris Impey**  
Random House, New York, 2007.  
\$27.95 (393 pp.).  
ISBN 978-1-4000-6506-6

Astrobiology is often said to be a subject for which there are no data. Some call it a subject without a subject. No unambiguous evidence exists for life anywhere beyond Earth, but the interdisciplinary field does inform us how

environmental conditions likely gave rise to life on Earth billions of years ago and how evolutionary events have changed and diversified life ever since. Reflecting on our own origins, researchers can reasonably speculate

about life in other cosmic settings. Most of all, astrobiology helps us build a modern *weltanschauung* (worldview) that people of all cultures can adopt—a Big-Bang-to-humankind story that traces generative and developmental changes from quark to quasar, from microbe to mind.

Biology in an astronomical setting was not invented by NASA a decade ago, though that agency has helped bolster the field by handsomely funding it, at least until recently. Astrobiology has been around for much longer under such aliases as exobiology, bioastronomy, cosmic evolution, and "big his-

tory." Indeed, all those subjects foster the interaction of a wide spectrum of natural scientists who are interested in addressing sweeping, integrated ideas about life in the universe writ large.

Chris Impey, a distinguished professor of astronomy at the University of Arizona in Tucson, is a widely respected galaxy researcher renowned for his teaching expertise. With William K. Hartmann he coauthored *Astronomy: The Cosmic Journey* (Brooks/Cole, 6th edition, 2002), an appealing introductory astronomy textbook. In *The Living Cosmos: Our*

*Search for Life in the Universe*, Impey makes his first attempt at producing a popular book for a general audience; the effort is only partly successful.

The book covers all the usual topics expected in such an exposition. Chapters on the history of our place in the universe and the origin of life on Earth are well written. However, for a book that claims that the discovery of life on other worlds would culminate the Copernican revolution, it oddly leaves out the work of Harlow Shapley, who relegated our Sun to the cosmic suburbs

The advertisement features a large background image of a star or galaxy. In the upper left, there is a screenshot of the Physics Today website from March 2007. The website shows a navigation bar with links for 'ADVERTISING', 'CAREER NETWORK', 'BUYERS GUIDE', 'EVENT CALENDAR', and 'REQUEST PRODUCT INFO'. The main content area includes 'new picks', 'online edition', 'highlights', 'table of contents', 'past issues', 'research today', and 'select a topic below'. A blue arrow points from the 'research today' section to a circular logo for 'physics today' with the URL 'www.physicstoday.org' and the date 'March 2007'. To the right of the logo is the book cover for 'The Living Cosmos' by Chris Impey. Below the logo and book cover, the text reads: 'For those who want all of Physics Today today!' in large, bold letters. At the bottom, it says 'Subscribers get access to the 70% of Physics Today content that's behind access controls. Simply register at www.physicstoday.org/ptreg.html'. The date '14 June 2024 18:43:36' is printed vertically on the right edge.



by revealing that its position is near the edge, not at the center, of the galaxy. Wonderful discussions of extremophilic life and of how biological evolution is often shaped by astronomical events follow, and it is here that Impey's writing shines. The latest insights from genetics about the metaphorical bush of life are particularly well done, if perhaps overly technical for the target audience. Alas, lateral gene transfer among bacteria is now casting doubt on our ability to ever identify a last common ancestor at life's origin. The book concludes with chapters on Mars and Titan, extrasolar planets, and SETI-type explorations. The first of those chapters surveys unsuccessful robotic searches for life on nearby alien worlds, and the third has little new to report about the hunt for extraterrestrial intelligence. Yet the presentation of distant exoplanets is cutting-edge and informative.

Readers of PHYSICS TODAY will find some of Impey's smooth prose jarring, with its English units and high speculation. Turning phrases into language suitable for general readers is often admirable, but the author suffers some lapses and inconsistencies in the process. For example, he writes, "About a half million years ago, the record of animal fossils peters out like a road winding into a thick fog" (page 69), but he actually means a half billion. In another peculiar sentence, Impey states that Orion "isn't far from home as the crow flies, only 1,800 light-years" (page 161), but today's best estimate is hardly more than half as much. Also, the author writes that "ALH84001 traveled a long, meandering journey to the Earth, taking sixteen million years to get here" (page 123), which contrasts with a similar statement a few chapters later (page 200) that gives a value of 10 million. Discerning readers will find other sweet phrases, albeit

occasionally tinged with sour content.

Illustrations in a trade book for a general audience are also admirable, but most of the more than 100 figures in the *The Living Cosmos* are poorly reproduced and technically unsuitable for the intended audience. Many minute graphs are not explained well for lay readers, neither in the text nor in the captions, and even nonexpert scientists will likely need to work to decipher some of them. Among many illustrations that are tiny and unclear is one that shows the rate of asteroid impacts during Earth's history (figure 59). This good example of a bad figure treats time disappointingly, with "Ga" units at the bottom, "b.y." at the top, and "m.y." for the plot-line labels, which are otherwise unexplained. In addition, the time axis increases right to left, whereas subsequent graphs in the same chapter show time increasing left, then right, left, right, down, up, and right. No effort was made to make these temporal graphs uniform, or at least consistent, and the resulting lack of clarity will almost surely confuse the target audience.

Publishers do very little for their authors these days. Even commercial, trade-book firms offer minimal editing, fact checking, and artistic help. It is sad to see an otherwise fine book, whose treatment and erudition are commendable, marred by poorly illustrated and inadequately explained figures that resemble a potpourri of unrelated PowerPoint slides. I recommend that readers wait for the next edition of *The Living Cosmos*, when the publisher will, hopefully, have invested some time and effort to improve the illustrations so that they actually support the book, rather than detract from it.

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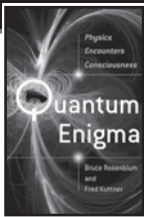
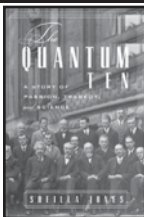

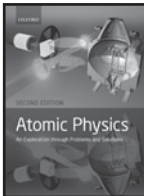
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