

decades later, physics is marginally more gender balanced, and happily we are also more receptive to a wider range of gender expressions. Female, non-binary, and male physicists are now more welcome to be “real scientists” in whichever choices of dress they prefer.

Such dips are contextualized by glimmers of self-importance, such as the author’s self-portrait cover and the almost boastful material in the foreword. Furthermore, although the content of *Real Scientists Don’t Wear Ties* is diverse, the collection can feel repetitive. Most of the essays have a structure derived from the recipe

Perkowitz outlines in the introduction: They start with an anecdote, move to “a look at the history of the subject,” and include “plentiful application of metaphor.” Still, for scientists trying their own hand at public communication, Perkowitz’s style is a good one to study.

The book’s grandiose yet comprehensive overviews of science topics bring to mind another recent book, *Liquid Rules: The Delightful and Dangerous Substances That Flow Through Our Lives* (2019) by materials scientist Mark Miodownik (see the review by Michelle Driscoll, PHYSICS TODAY, August 2019, page 54). That book

also explains a wealth of scientific concepts, but uses the theme of examining liquids on an airplane to make the topics cohere into a single narrative. In comparison, *Real Scientists Don’t Wear Ties* feels scattered at times. However, readers of all backgrounds will still benefit from the engaging prose in Perkowitz’s diverse collection. Let us hope that if more physicists read this book, more of us will be convinced to distill our own research and ideas into writing for public consumption.

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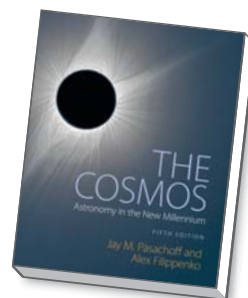
A descriptive overview of astronomy

Introductory astronomy is one of the most popular general education STEM (science, technology, engineering, and mathematics) classes at colleges and universities. Most students who enroll in it are nonscience majors, and astronomy is the last, or perhaps only, college-level science course they will ever take. *The Cosmos: Astronomy in the New Millennium*, now in its

fifth edition, offers a descriptive presentation of astronomy with that audience in mind. Authors Jay Pasachoff and Alex Filippenko are accomplished astronomers, celebrated educators, and champions of science popularization. Their experience communicating science to nonprofessionals is evident in the updated edition of *The Cosmos*, a comprehensive, easy-to-

**The Cosmos
Astronomy in the
New Millennium**

Jay Pasachoff and
Alex Filippenko
Cambridge U. Press,
2019 (5th ed.).
\$79.99 (paper)



read survey of astronomy appropriate for use in a general-education science course.

The diverse array of topics presented in *The Cosmos* allows professors great flex-

ibility when using the book in their courses. The text could be assigned for either a one-semester survey course emphasizing selected topics or a two-semester introductory sequence using the entire book. The first few chapters cover general ideas about the nature of astronomy, light, telescopes, celestial motions, and gravity. The book moves on to a grand tour of the universe, beginning with Earth and moving outward through space and introducing readers to topics such as stars, stellar evolution, black holes, galaxies, and cosmology. The newest edition includes recent developments such as the results of the New Horizons mission to Pluto and Ultima Thule, the 2017 total solar eclipse, gravitational wave detections, and the Kepler and TESS missions—additions I appreciate.

To help students engage with the material, the authors have included several interesting pedagogical features, such as the “Star Parties” and “Lives in Science” boxes interspersed throughout the text. “Star Parties” boxes contain observational exercises related to the material. For example, students are instructed on how they could re-create Galileo’s observations with a small telescope or track the motion of Jupiter and Saturn through the sky over the course of several days. Those features encourage students to connect to the material outside the classroom.

As the name suggests, “Lives in Science” boxes provide short biographies about notable scientists. I think they have the potential to foster an inclusive classroom atmosphere by portraying scientists as real people; biographical stories help students feel that they, too, can make meaningful contributions to science. I was therefore surprised to find that only six individuals were featured: Nicolaus Copernicus, Tycho Brahe, Johannes Kepler, Galileo Galilei, Isaac Newton, and Albert Einstein. I am disappointed that the book did not include stories of more recent and diverse scientists.

Furthermore, although the authors successfully provide a descriptive presentation of astronomy, I have concerns about some gaps and omissions in the text. *The Cosmos* occasionally lacks depth, and the choices of key terms are not always carefully thought through. For example, the concepts of continuous spectra and absorption lines are well developed, and both terms appear in bold-face for easy identification. However, the

authors do not provide the same level of description for the equally important emission lines; the text mentions them only briefly and does not put the term in bold. Similarly, the beginning of the section describing the appearance of the Moon reads, “Even binoculars reveal that the Moon’s surface is pockmarked with craters. Other areas, called maria [...], are relatively smooth and dark.” That description makes no mention of the lunar highlands, a major feature of the Moon’s appearance. Such inconsistencies and omissions in the coverage of important terms are troubling.

The authors do an excellent job of using figures and photographs to aid in the explanation of concepts and hold students’ interest. However, not all of the images are well presented or pedagogically useful. Several pictures are grouped into multipart figures with one overwhelmingly long caption describing the set. In many instances, the captions contain more information about the concept than the text itself. Although I appreciate the number of images, I wish some of them were better incorporated into the text.

Astronomy educators often debate the

appropriate amount of quantitative material for an introductory astronomy course. Pasachoff and Filippenko acknowledge that many instructors will prefer a more mathematical description of the universe’s physical processes than the one provided in their book. I view astronomy as a quantitative science, and *The Cosmos* includes too little math for my taste. If you are looking for an introductory astronomy textbook that includes a significant quantitative component, then this is not the book for you.

Overall, *The Cosmos* provides an excellent tour of the universe for those interested in a qualitative description of a broad array of topics in astronomy. Several features will encourage student engagement and allow instructors in diverse astronomy classes to customize their use of the text. However, the textbook occasionally lacks sufficient depth. I would suggest that instructors looking for more than a basic overview consider supplementing *The Cosmos* with deeper discussions of physical phenomena and quantitative ideas.

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HIGH ENERGY ACCELERATOR
RESEARCH ORGANIZATION

Call for Nomination for Next Director General of KEK

KEK, High Energy Accelerator Research Organization, invites nominations for the next Director General whose term will begin April 1, 2021.

In view of his/her role that presides over the business of KEK as a representative of the Inter-University Research Institute Corporation, nominees shall be:

1) persons of noble character, with relevant knowledge and experience and having abilities to manage its educational and research activities properly and effectively. **2)** persons expected to promote with long-term vision and strong scientific leadership, the highly advanced, internationalized, and inter-disciplinary research activities of KEK by getting support from the public. **3)** persons expected to establish and carry out the medium-term goals and plans.

The term of appointment is three years until March 31, 2024 and shall be eligible for reappointment only twice. Thus, he/she may not remain in office continuously over a period 9 years.

We widely accept the nomination of the candidates regardless of their nationalities.

We would like to ask you to recommend the best person who satisfies requirements for the position written above.

Nomination should be accompanied by: **1)** letter of recommendation, **2)** brief personal history of the candidate, and **3)** list of major achievements (publications, academic papers, commendations and membership of councils, etc.).

The nomination should be submitted to the following address no later than May 29, 2020:

- Documents should be written either in English or in Japanese.
- Forms are available at: <https://www.kek.jp/en/newsroom/2020/03/02/1000/>

Inquiries concerning the nomination should be addressed to:

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KEK, High Energy Accelerator Research Organization
1-1 Oho, Tsukuba, Ibaraki 305-0801 Japan

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