engineers at Langley and JPL faced incredible odds in pursuing personal and professional goals simultaneously, but I never got a sense of what either set of women meant to the programs for which they worked. What is quite apparent is the remarkable strength of the communities the women built to support each other inside and outside the workplace.

Although neither Holt nor Shetterly engages with the breadth of existing scholarship on race and gender issues at NASA or its predecessors, they forge new pathways for additional investigations. Taking a multibiographical approach does complicate their narratives, but those complications are necessary to relate the stories. The female technical experts, well aware of their uniqueness in their fields and in their places of employment, played important roles in human and robotic spaceflight, despite decades of being hidden from public view. Uncovering and telling such stories will hopefully lead to deeper scholarly examinations that will enrich our understanding of what women of all backgrounds meant to NASA and what NASA continues to mean to young women interested in careers in science, technology, engineering, and mathematics.

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Group Theory in a Nutshell for Physicists

A. Zee

Princeton U. Press, 2016. $90.00 (632 pp.).
ISBN 978-0-691-16269-0

Many books have been written about group theory's applications to physics. Some have an arid, mathematically rigorous style that often obscures physical insight. Other, less formal presentations usually cannot deliver the necessary know-how for practical applications. In *Group Theory in a Nutshell for Physicists*, Anthony Zee, a physicist at the University of California, Santa Barbara, combines clarity of presentation with mathematical detail at a level of rigor acceptable to physicists. The result is a tour de force that guides readers through the universe of group theory and leads them to recent applications in particle physics, cosmology, and condensed matter.

The book is unique in its laid-back presentation. It is peppered with colorful stories about famous mathematicians and physicists and includes frequent interjections from fictitious characters. Particularly helpful are the mutterings of Dr. Feeling, who supplies intuitive understandings of formal definitions or theorems, and the observations by Confusio, who (not surprisingly) points out issues of possible confusion. The book is ideally suited to accompany a graduate course on symmetries in physics because of its pedagogical approach, the detail of its illustrative examples, and its many exercises. Readers need to be familiar with the basics of quantum mechanics, but little other advance knowledge is required since the book starts with a brief review of linear algebra and a reminder of the properties of matrices.

After its mathematical refresher, the book turns to a detailed presentation of the representation theory of finite groups and the introduction of Lie groups. Early on, Zee introduces Lie algebras by way of three-dimensional rotations; the classification of those algebras by roots, weights, and Dynkin diagrams comes later. The book's mathematically detailed material is interspersed with group theoretical applications to physical systems. Given the author's distinguished career in particle physics, it is not surprising that most of the examples come from that field, but Zee occasionally ventures out to other areas with examples relevant to condensed-matter and atomic physics.

The book makes only a single mention of group theory applied to atomic nuclei (my field of expertise), and that appears as a footnote when Zee discusses the Elliott model. James Philip Elliott's application of $SU(3)$ is admittedly of less fundamental importance than the application of that group to particle physics, but the mathematics behind Elliott's application is more sophisticated. After reading about how the finest minds in the particle-physics community struggled to get the eightfold way right, I can only admire Elliott's achievement even more, as he developed the $SU(3)$ model of nuclei essentially by himself.

The book does not comprehensively discuss the representation theory of the symmetric group of permutations, and the author even advises readers to stay clear of the diagrammatic machinery of Young tableaux. That may be sensible advice when one is dealing with low-dimensional representations. However, as the dimension of the representation increases, as is the case, for example, in quantum many-body physics, Zee's treatment in terms of either totally symmetric or totally antisymmetric tensors rapidly becomes cumbersome, and Young tableaux are called for.

Eugene Wigner, who introduced group theory into quantum mechanics and is therefore one of the heroes of the book, famously wrote about the "unreasonable effectiveness" of mathematics. In the final chapters of his text, Zee forcefully makes the case for the unreasonable effectiveness of group theory and buttresses his case with many compelling examples. Group theory can generate everything from the Dirac equation for the electron to the equations that describe the expanding universe. Indeed, all known particles can be unified within the framework of the Lie group $SU(5)$.

With *Group Theory in a Nutshell for Physicists*, Zee convincingly demonstrates that group theory governs the physical universe, and he gives aspiring physicists the tools to understand its applications to their work.

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Strange Glow

The Story of Radiation

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Timothy Jorgensen's *Strange Glow: The Story of Radiation* has two purposes: to educate the lay public about the various real and imagined health risks radiation poses to humans and to tell "the story of radiation," as his subtitle has it, from x rays to mobile phones. An accomplished radiation biologist, Jorgensen succeeds as a communicator of the current state of the fraught and fluid field in which he works. *Strange Glow*'s historical account is less adept, however. General audiences will likely struggle with an overabundance of detail, while histori-