



“Physics in Canada”

Book Review

“La Physique au Canada”

Critique de livre

“Fearful Symmetry: The Search for Beauty in Modern Physics” by A. Zee, Princeton University Press, 2016, ISBN 9780691173269, 376 pages, price: 31.99

There are few popular physics books which are worth recommending to a student beginning a new subject. Tony Zee’s “Fearful symmetry” is one of them. This book should be productive reading for students studying particle physics or group theory in physics. This is not only because the book presents technical material honestly, but also because the book reads easily. To achieve this, Zee maintains the unusual writing style he is known for in his textbooks - short and pointed sections colored with references to art, literature and anecdote.

Zee covers some of the usual ground for a popular physics book, for instance quantum mechanics, relativity, and the Standard Model. Additionally however he reaches topics rarely touched: groups, non-abelian gauge theory, spontaneous symmetry breaking and supersymmetry. By presenting these topics and tying them to a unifying theme of symmetry and the aesthetic sense of the theorist, Zee presents one of the most recognizable portraits of work as a theoretical physicist available in popular work.

To Zee, beauty, largely as expressed through symmetry, is a powerful guiding force in theoretical physics. Also running throughout the work is a persistent reference to God or a Designer. Usually among theorists such references are linguistic conveniences or metaphors (as was the case for Einstein, a frequent source of such usages), though this subtlety is an inevitable point of confusion. In Zee’s case however the references are more than metaphor, as he believes in a presence of some kind responsible for creating the universe. Indeed, Zee views the aesthetics of the universes design, as evidenced through the role of symmetry, along with the basic fact of the universes comprehensibility as evidence for this deistic view.

Zee’s views on deism and aesthetics contribute much of the uniqueness of the book. At times though Zee risks portraying theoretical physics as a mystic art, and it is worth emphasizing a counterbalancing view. My own view is that theoretical physics is not at all divorced from observation - and so not at all a mystic art - even in a case such as string theory. In that case, theorists have chosen to focus on the core principles of quantum mechanics and gravity, and work mathematically to tie them together into a consistent theory. Those principles however are well grounded in experiment. Momentarily ignoring some details and beginning from basics is sometimes necessary to make conceptual jumps. In fact, Zee makes a similar point in the context of general relativity - Einstein did not arrive at his theory by studying observations of the orbit of Mercury, but by revisiting long known simple observations.

While Zee’s views may not align precisely with my own, he has written an excellent book. It will

be of interest not only to the new student, but also to any artist or layperson interested in beauty. Zee has made great progress in making the beauty of symmetry in physical law accessible for a wide audience.

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