



KNOCKING ON HEAVEN'S DOOR



How Physics and Scientific Thinking Illuminate the Universe and the Modern World
By **Lisa Randall** (Author)

From Randall (Theoretical Physics/Harvard Univ.; *Warped Passages: Unraveling the Universe's Hidden Dimensions*, 2006), a whip-smart inquiry into the scientific work being conducted in particle physics.

The author examines some fairly recondite material—the philosophical and methodological underpinnings of the study of elementary particles (with a brief foray into cosmology)—and renders it comprehensible for general readers. She brings a thrumming enthusiasm to the topic, but she is unhurried and wryly humorous. She explains how physicists conduct their theoretical studies, the logic involved and the confidence that comes only in what's verified or deduced through experimentation. That knowledge must always be open to change, surrounded as it is by an amorphous boundary of uncertainties, where research is conducted in a state of indeterminacy, testing and questioning to ascertain veracity and implications (which includes investigating the likes of string theory, which doesn't yield experimental consequences but may provide new ways of thinking). Randall brings great clarity to the application of theory. Not only will readers come to feel comfortably familiar with scaling—why, for instance, Newton's laws work on one scale but not another—or how the Large Hadron Collider will provide access to fundamental particles, but appreciate how one “sees” a subatomic particle when visible light's wavelength is too big to resolve it. While much of the book concerns the behavior of quarks, leptons and gauge bosons, the author ranges freely into the advantages and disadvantages of aesthetic criteria in science, the importance of symmetry and the creation and nature of black holes, black energy and black matter: “Why should all matter interact with light? If the history of science has taught us anything, it should be the shortsightedness of believing that what we see is all there is.”

A tour of subatomic physics that dazzles like the stars.

Pub Date: Sept. 20th, 2011

ISBN: 978-0-06-172372-8

Page count: 464pp

Publisher: Ecco/HarperCollins