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String Theory and M-Theory: A Modern Introduction

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rent status of the field of quantum information theory, and attempts to bridge the quantum–classical divide. For the most part, they avoid equations. Nevertheless, the arguments require some prior knowledge of quantum theory. Each chapter offers many references to the relevant literature that will help students read further.

The reappraisal suggested in the book provides a fresh perspective on Einstein's work in light of researchers' current best understanding of quantum physics. It also justifies the authors' passionate plea for an "open spirit of tolerance." With their goals set between a rock and a hard place, between history and ongoing science, the authors have won my full support. I recommend *Einstein's Struggles with Quantum Theory* to physicists who are interested in their past and to historians and philosophers who are curious about today's quantum physics.

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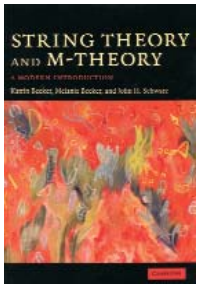
String Theory and M-Theory

A Modern Introduction

Katrin Becker, Melanie Becker, and John H. Schwarz
Cambridge U. Press, New York, 2007. $80.00 (739 pp.). ISBN 978-0-521-86069-7

It has been 40 years since Gabriele Veneziano wrote his celebrated scattering amplitude, which marked the beginning of string theory. In the intervening years, the theory has morphed into one of the most interesting fields of scientific study, providing new theoretical vistas in mathematics, quantum field theory, and the nature of black holes, and possible guideposts for physics beyond the standard model, such as supersymmetry and extra space dimensions. Those events were described in their masterful two volumes of *Superstring Theory* (Cambridge University Press, 1987) by Michael Green, John Schwarz, and Edward Witten. In 1998, Joseph Polchinski's *String Theory*, also a two-volume presentation from the same publisher, included the latest breakthroughs.



Today, Katrin Becker, Melanie Becker, and Schwarz have written *String Theory and M-Theory: A Modern Introduction*, a one-volume textbook that covers not only earlier progress in string theory but also the mind-boggling developments of the last decade: the emergence of 11-dimensional M-theory; the AdS/CFT (anti-de Sitter/conformal field theory) correspondence; flux compactification and moduli stabilization; black hole statistical mechanics; and the beginnings of string-based cosmologies. The work teams up one of the celebrated founding fathers of modern superstring theory with two much younger authors who have also contributed much to the field. The Beckers, sisters who are both physics professors at Texas A&M University, and Schwarz, the Harold Brown Professor of Theoretical Physics at Caltech, are eminently competent to present the complicated subjects. *String Theory and M-Theory* promises to become the new standard text.

The book is well written and covers a set of judiciously chosen topics. Compared with its predecessors, it has more pedagogical value. Each of its 12 chapters begins with a descriptive introduction, which is bound to be useful to those students and researchers, such as string phenomenologists, who need to understand the concepts without being burdened by technical details. Those preambles provide a road map for the sometimes confusing topics and give some sense of perspective to the necessarily technical presentations that follow. More significant, the technical material is supplemented by exercises that are well chosen to illustrate the most difficult concepts; though many have accompanying solutions, the more dedicated students will eagerly work through those that do not.

Graduate students with some training in mathematics and a degree of familiarity with quantum field theory will enjoy *String Theory and M-Theory*. In writing a self-contained text for the enormous and still-evolving subject area, the authors had to make compromises. One volume may not have sufficed to cover the developments of the past decade. Thus, important subjects, such as M-theory and the profound AdS/CFT connection, are not treated with a level of detail that will satisfy the most inquisitive readers. Explicit calculations, absent except in the exercises, would have further enhanced the pedagogical value of the book. Nevertheless, it is a welcome addition to the literature and will most likely be the required text for those physicists who intend to study the many facets of this fascinating subject. Further understanding of string theory is bound to produce more surprises. In the meantime, *String Theory and M-Theory* is *the* string textbook—at least until the next string revolution.

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Don't Try This at Home!

The Physics of Hollywood Movies

Adam Weiner
Kaplan, New York, 2007. $17.95 paper (264 pp.). ISBN 978-1-4195-9406-9

If there is one thing Adam Weiner's *Don't Try This at Home! The Physics of Hollywood Movies* has in abundance, it is style. Like an Indiana Jones movie, Weiner's prose moves at high speed from the very start, where he introduces for dissection the first cinematographic corpus, a well-known 2002 action film:

> In *XXX*, Xander Cage (how's that for a name?), played by Vin Diesel (how's that for a name?), is an extreme counter-culture rebel looking for adrenaline thrills while sticking it to "the man" whenever he can. He's tattooed, tough, and fearless.

Weiner later describes a particularly exciting section of the film:

> In *XXX*'s climactic scenes 25 and 27, Yorgi has just released the automated boat containing the toxic gas containers onto the Danube. It is traveling "80 mph at least" according to Vin Diesel, as he and Yelena frantically try to stay parallel with it while driving on the road adjacent to the river in their specially outfitted GTO. . . . Fortunately the car has been equipped with rocket launchers that the two heroes use to blast wooden crates and bales of hay out of their way so that they don't have to slow down much.

After a page of setting up the movie, Weiner, a physics teacher at the Bishop's School, a college preparatory school in La Jolla, California, moves on to a four-page exposition of one-dimensional kinematics, which can be used to judge the likelihood that the car will catch up to the boat. According to the blurb on its back cover, the book is supposed to teach film buffs and physics students alike the major topics found in