WEAK SCALE SUPERSYMMETRY

From Superfields to Scattering Events

Supersymmetry has been proposed as a new symmetry of nature. Supersymmetric models of particle physics predict new superpartner matter states for each known particle in the Standard Model. The existence of such superpartners will have wide-ranging implications, from the early history of the Universe to what is observed at high energy accelerators such as CERN's LHC.

In this text, the authors develop the concepts of supersymmetry from first principles, and show how it can be incorporated into a theoretical framework for describing unified theories of elementary particles. They develop the technical tools of supersymmetry using four-component spinor notation familiar to high energy experimentalists and phenomenologists. The text takes the reader from an abstract formalism to a straightforward recipe for writing supersymmetric gauge theories of particle physics, and ultimately to the calculation of cross sections and decay rates necessary for practical applications to experiments both at colliders and for cosmology.

This advanced text is a comprehensive, practical, and accessible introduction to supersymmetry for experimental and phenomenological particle physicists and graduates studying supersymmetry. Some familiarity with the Standard Model and tree-level calculations in quantum field theory is required. Exercises and worked examples that supplement and clarify the material are interspersed throughout.

This title, first published in 2007, has been reissued as an Open Access publication on Cambridge Core.

HOWARD BAER is currently the J. D. Kimel Professor of Physics at Florida State University. He received his Ph.D. in theoretical physics from the University of Wisconsin in 1984 and has held postdoctoral appointments at the European Laboratory for Particle Physics (CERN), Argonne National Laboratory, and Florida State University. Dr. Baer is a Fellow of the American Physical Society. He has published over a hundred articles on the physics of elementary particles.

XERXES TATA is a professor in the Department of Physics and Astronomy, University of Hawaii. He received his Ph.D. in theoretical high energy physics from the University of Texas at Austin. He has done postdoctoral work at the University of Oregon, the European Laboratory for Particle Physics (CERN), and the University of Wisconsin. He was also a visiting scientist at the High Energy Accelerator Research Organization (KEK), Japan. He joined the University of Hawaii in 1988. Dr. Tata has published over a hundred research articles in high energy physics, and is a Fellow of the American Physical Society.

Published online by Cambridge University Press

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HOWARD BAER
Florida State University

XERXES TATA
University of Hawaii

CAMBRIDGE
UNIVERSITY PRESS

Published online by Cambridge University Press



Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

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www.cambridge.org
Information on this title: www.cambridge.org/9781009289849

DOI: 10.1017/9781009289801

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When citing this work, please include a reference to the DOI 10.1017/9781009289801

First published 2007
Reissued as OA 2022

A catalogue record for this publication is available from the British Library.

ISBN 978-1-009-28984-9 Hardback
ISBN 978-1-009-28983-2 Paperback

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Published online by Cambridge University Press