One of the triumphs of modern particle physics has been the extent to which Quantum Chromodynamics (QCD) has successfully accounted for the strong interaction processes observed at colliders, most notably the dramatic phenomena of hadronic jet and heavy quark production, and the short-distance parton structure of hadrons.

This book gives a comprehensive overview of the physics of high-energy colliders with special emphasis on the study of QCD. After a general description of the QCD Lagrangian, and the properties of asymptotic freedom and colour confinement which follow from it, the most important applications at high-energy colliders are described in detail. These include the production of jets, heavy quarks, electroweak gauge bosons and Higgs bosons. The various methods of measuring the strong coupling constant are summarized. Many important theoretical results are derived from first principles, and the book will be both a textbook and a valuable source of reference material for all particle physicists. This title is also available as open access on Cambridge Core.

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QCD and Collider Physics

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PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS
The Edinburgh Building, Cambridge CB2 2RU, UK
40 West 20th Street, New York NY 10011–4211, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
Ruiz de Alarcón 13, 28014 Madrid, Spain
Dock House, The Waterfront, Cape Town 8001, South Africa

http://www.cambridge.org

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When citing this work, please include a reference to the
DOI 10.1017/9780511628788

First published 1996
First paperback edition 2003

A catalogue record for this book is available from the British Library

Library of Congress Cataloguing in Publication data

Ellis, R. K. (R. Keith)
QCD and collider physics / R. K. Ellis, W. J. Stirling, B. R. Webber.
p. cm Includes index.
ISBN 9780521581899 hardback
ISBN 9780521545891 paperback
1. Quantum chromodynamics 2. Colliders (Nuclear physics)
I. Stirling, W. J., 1953– . II. Webber, B. R., 1943– .
III. Title.
QC793.3.Q35E44 1996
539.7′548-dc20 96-31560 CIP

ISBN 9780521581899 hardback
ISBN 9780521545891 paperback

Transferred to digital printing 2003

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