CLASSICAL SOLUTIONS IN QUANTUM FIELD THEORY

Classical solutions play an important role in quantum field theory, high energy physics, and cosmology. Real time soliton solutions give rise to particles, such as magnetic monopoles, and extended structures, such as domain walls and cosmic strings, that have implications for the cosmology of the early universe. Imaginary time Euclidean instantons are responsible for important nonperturbative effects, while Euclidean bounce solutions govern transitions between metastable states.

Written for advanced graduate students and researchers in elementary particle physics, cosmology, and related fields, this book brings the reader up to the level of current research in the field. The first half of the book discusses the most important classes of solitons: kinks, vortices, and magnetic monopoles. The cosmological and observational constraints on these are covered, as are more formal aspects, including BPS solitons and their connection with supersymmetry. The second half is devoted to Euclidean solutions, with particular emphasis on Yang–Mills instantons and on bounce solutions. This title is also available as open access on Cambridge Core.

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Classical Solutions in Quantum Field Theory

Solitons and Instantons in High Energy Physics

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University Printing House, Cambridge CB2 8BS, United Kingdom

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www.cambridge.org
Information on this title: www.cambridge.org/9780521114639

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When citing this work, please include a reference to the DOI 10.1017/9781139017787

First published 2012

Printed in the United Kingdom at the University Press, Cambridge

A catalog record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data
Weinberg, Erick J.
Classical solutions in quantum field theory : solitons and instantons in high energy physics / Erick J. Weinberg.
p. cm. – (Cambridge monographs on mathematical physics)
Includes bibliographical references and index.
ISBN 978-0-521-11463-9 (hardback)
1. Quantum theory – Mathematics. I. Title.
QC174.17.M35W45 2012
530.12–dc23
2012015503

ISBN 978-0-521-11463-9 Hardback
ISBN 978-1-107-43805-7 Paperback

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