BIT-STRING PHYSICS

A Finite and Discrete Approach to Natural Philosophy

This page is intentionally left blank

Series on Knots and Everything — Vol. 27

BIT-STRING PHYSICS

**A Finite and Discrete Approach
to Natural Philosophy**

H. Pierre Noyes

Stanford University, USA

edited by

J. C. van den Berg

*Wageningen University
The Netherlands*

World Scientific

Singapore • New Jersey • London • Hong Kong

Published by

World Scientific Publishing Co. Pte. Ltd.

P O Box 128, Farrer Road, Singapore 912805

USA office: Suite 1B, 1060 Main Street, River Edge, NJ 07661

UK office: 57 Shelton Street, Covent Garden, London WC2H 9HE

Library of Congress Cataloging-in-Publication Data

Noyes, H. Pierre.

Bit-string physics : a finite and discrete approach to natural philosophy / H. Pierre

Noyes ; edited by J.C. van den Berg.

p. cm. -- (K & E series on knots and everything ; vol. 27)

Includes bibliographical references.

ISBN 9810246110

I. Physics--Philosophy. I. Berg, J. C. van den, 1944-- II. Series.

QC5.58 .N69 2001

630'.01--dc21

2001026980

British Library Cataloguing-in-Publication Data

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

The editors and publisher would like to thank the following organisations and publishers of the various journal for their permission to reproduce the selected reprints found in this volume:

Alternative Natural Philosophy Association

Elsevier Science

Indian Statistical Institute

Plenum Publishing Corporation

Physics Essays Publication

The Royal Society

Copyright © 2001 by World Scientific Publishing Co. Pte. Ltd.

All rights reserved. This book, or parts thereof, may not be reproduced in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system now known or to be invented, without written permission from the Publisher.

For photocopying of material in this volume, please pay a copying fee through the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, USA. In this case permission to photocopy is not required from the publisher.

Printed in Singapore by Mainland Press

To Mary

‘Fair, kind and true’ have often liv’d alone
Which three till now never kept seat in one

Sonnet CV — Shakespeare

This page is intentionally left blank

CONTENTS

Introduction 1

1. Non-Locality in Particle Physics 8

 Comment on “*Non-Locality in Particle Physics*” 62

2. On the Physical Interpretation and the Mathematical Structure of the
Combinatorial Hierarchy 64

(with T. Bastin, J. Amson, and C. W. Kilmister)

 Comments by T. Bastin, C. W. Kilmister, J. Amson and HPN on “*On the
Physical Interpretation and the Mathematical Structure of the
Combinatorial Hierarchy*” 108

3. On the Construction of Relativistic Quantum Theory: A Progress Report 117

 Comment on “*On the Construction of Relativistic Quantum Theory:
A Progress Report*” 170

4. Foundations of a Discrete Physics 173

(with D. McGoveran)

5. An Essay on Discrete Foundations for Physics 266

(with D. McGoveran)

6. On the Fine-Structure Spectrum of Hydrogen 291

(with D. McGoveran)

 Comment by D. McGoveran on “*Our Joint Work*” 297

 Other Second Order Corrections and Some Further Speculations 305

by D. McGoveran

 The Electron-Proton Mass Ratio 310

by D. McGoveran

 Adding in Quadrature: Why? 312

by D. McGoveran

7. Comment on “*Statistical Mechanical Origin of the Entropy of a
Rotating, Charged Black Hole*” 318

Comment on This Comment	321
8. Anti-Gravity: The Key to 21 st Century Physics	322
Comment on “ <i>Anti-Gravity: The Key to 21st Century Physics</i> ”	348
9. Crossing Symmetry is Incompatible with General Relativity	350
Comment on “ <i>Crossing Symmetry is incompatible with General Relativity</i> ”	354
10. Operationalism Revisited: Measurement Accuracy, Scale Invariance and the Combinatorial Hierarchy	355
Comment on “ <i>Operationalism Revisited: Measurement Accuracy, Scale Invariance and the Combinatorial Hierarchy</i> ”	390
11. Discrete Physics and the Derivation of Electromagnetism from the Formalism of Quantum Mechanics	391
(with L. H. Kauffman)	
12. Discrete Physics and the Dirac Equation	406
(with L. H. Kauffman)	
Comments by L. H. Kauffman on “ <i>Joint Work with Pierre Noyes</i> ”	414
13. Are Partons Confined Tachyons?	431
Comment on “ <i>Are Partons Confined Tachyons?</i> ”	445
14. A Short Introduction to Bit-String Physics	446
15. Process, System, Causality and Quantum Mechanics: A Psychoanalysis of Animal Faith	488
(with T. Etter)	
Reflections by Tom Etter on “ <i>Process, System, Causality and Quantum Mechancis: A Psychoanalysis of Animal Faith</i> ”	538
16. Bit-String Physics Prediction of η , the Dark Matter/Baryon Ratio and Ω_M	558
Comment on “ <i>Bit-String Physics Prediction of η, the Dark Matter/Baryon Ratio and Ω_M</i> ”	575
Acknowledgments	577