Classical Covariant Fields

This book discusses the classical foundations of field theory, using the language of variational methods and covariance. There is no other book which gives such a comprehensive overview of the subject, exploring the limits of what can be achieved with purely classical notions. These classical notions have a deep and important connection with the second quantized field theory, which is shown to follow on from the Schwinger Action Principle. The book takes a pragmatic view of field theory, focusing on issues which are usually omitted from quantum field theory texts. It uses a well documented set of conventions and catalogues results which are often hard to find in the literature. Care is taken to explain how results arise and how to interpret results physically, for graduate students starting out in the field. Many physical examples are provided, making the book an ideal supplementary text for courses on elementary field theory, group theory and dynamical systems. It will also be a valuable reference for researchers already working in these and related areas. This title, first published in 2005, has been reissued as an Open Access publication Cambridge Core.

MARK BURGESS obtained his PhD in theoretical physics from the University of Newcastle Upon Tyne in 1990. He held a Royal Society fellowship at the University of Oslo from 1991 to 1992, and then had a two-year postdoctoral fellowship from the Norwegian Research Council. Since 1994, he has been an associate professor at Oslo University College. Dr Burgess has been invited to lecture at universities and institutes throughout the world, and has published numerous articles, as well as five previous books.

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