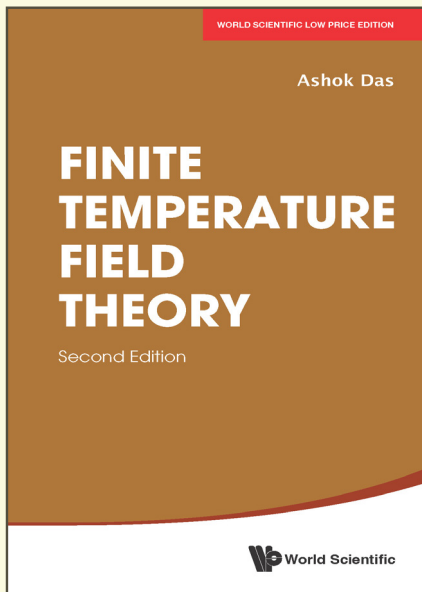


Finite Temperature Field Theory

2nd Edition



By **Ashok Das**
(University of Rochester, USA)

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ABOUT THE BOOK

This book discusses all three formalisms used in the study of finite temperature field theory, namely the imaginary time formalism, the closed time formalism and thermofield dynamics. In addition, the finite temperature description on an arbitrary path in the complex t -plane is also described in detail. Gauge field theories and symmetry restoration at finite temperature are among the practical examples discussed in depth. The thermal operator representation relating the zero temperature Feynman graphs to the finite temperature ones are also explained in depth. Applications of the formalisms are worked out in detail. The consistent generalization of light-front field theories to finite temperature is systematically explained as well as the phenomenon of Unruh radiation. Cutting (Cutcosky) rules for the imaginary parts of amplitudes at finite temperature are discussed in careful detail and examples are worked out. Spontaneous and dynamical symmetry breaking and possible symmetry restoration at finite temperature are described. The question of gauge dependence of the effective potential as well as physical parameters (like mass) and the Nielsen identities are explained with examples. The methods for calculating effective actions at finite temperature are described with examples. The subtleties which arise at finite temperature are pointed out in detail also with examples. The nonrestoration of some of the symmetries at high temperature (such as supersymmetry) and theories on nonsimply connected space-times are described thoroughly. Examples of nonequilibrium phenomena are discussed with the disoriented chiral condensates as an illustration. Fluctuation-dissipation theorem is explained in detail and is worked out systematically for glassy materials. Several appendices are added at the end of some of the chapters to help the readers appreciate the discussions of the individual chapters.

This book is a very useful tool for graduate students, teachers and researchers in theoretical physics.

READERSHIP

Graduate students, teachers and researchers in theoretical physics.

CONTENTS

- Imaginary Time Formalism
- Real Time Formalism
- Thermofield Dynamics
- A General Contour in the Complex t-plane
- Gauge Theories
- Thermal Operator Representation
- Light-front Field Theories at Finite Temperature
- Cutting Rules at Finite Temperature
- Spontaneous Symmetry Breaking
- Nielsen Identities
- Subtleties at $T \neq 0$
- Supersymmetry at $T \neq 0$
- Effective Actions
- Non-Equilibrium Phenomena
- Fluctuation-Dissipation Theorem

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