

The series of texts, *Classical Theoretical Physics*, is based on the highly successful series of courses given by Walter Greiner and his colleagues at the Johann Wolfgang Goethe University in Frankfurt am Main, Germany. Intended for advanced undergraduates and beginning graduate students, the volumes in this series will provide not only a complete survey of classical theoretical physics but also an enormous number of worked examples and problems to show students clearly how to apply the underlying principles to realistic problems.

*Thermodynamics and Statistical Mechanics* covers:

#### **Thermodynamics**

- basic definitions of thermodynamics, equilibrium, state variables
- the first and second laws
- phase transitions and chemical reactions
- thermodynamic potentials

#### **Statistical Mechanics**

- statistics of microscopic states and connection to the entropy
- the microcanonical, canonical and grand canonical ensembles
- applications of Boltzmann statistics

#### **Quantum Statistics**

- the density operator
- many-particle wave functions
- ideal quantum systems
- the ideal Bose gas and applications to blackbody radiation, Kirchhoff's law, and lattice vibrations
- the ideal Fermi gas and applications to condensed-matter physics, astrophysics, and nuclear physics
- relativistic Bose and Fermi gases and applications to particle physics

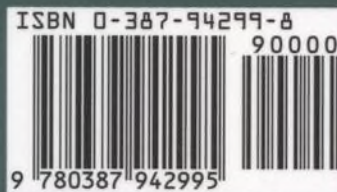
#### **Real Gases and Phase Transitions**

- real gases and the virial expansion
- classification of phase transitions and critical indices

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