



Theoretical Mechanics of Particles and Continua (Dover Books on Physics)

By Alexander L. Fetter, John Dirk Walecka

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This two-part text fills what has often been a void in the first-year graduate physics curriculum. Through its examination of particles and continua, it supplies a lucid and self-contained account of classical mechanics — which in turn provides a natural framework for introducing many of the advanced mathematical concepts in physics.

The text opens with Newton's laws of motion and systematically develops the dynamics of classical particles, with chapters on basic principles, rotating coordinate systems, lagrangian formalism, small oscillations, dynamics of rigid bodies, and hamiltonian formalism, including a brief discussion of the transition to quantum mechanics. This part of the book also considers examples of the limiting behavior of many particles, facilitating the eventual transition to a continuous medium.

The second part deals with classical continua, including chapters on string membranes, sound waves, surface waves on nonviscous fluids, heat conduction, viscous fluids, and elastic media. Each of these self-contained chapters provides the relevant physical background and develops the appropriate mathematical techniques, and problems of varying difficulty appear throughout the text.

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Editorial Review

About the Author

John Dirk Walecka obtained his PhD in nuclear theory from the Massachusetts Institute of Technology in 1958. He was Professor of Physics at Stanford University from 1966 to 1987 and then went on to become Scientific Director of the Continuous Electron Beam Accelerator Facility (CEBAF) from 1986 to 1992. He is now Governor's Distinguished CEBAF Professor of Physics at the College of William and Mary. His research interests cover theoretical nuclear and sub-nuclear physics, in particular nuclear structure, the relativistic nuclear many-body problem, strong-coupling QCD, and electroweak interactions with nuclei. He has published numerous papers on nuclear physics, and in 1996 the American Physical Society recognized his work with the award of the Bonner Prize. He has lectured on electron scattering throughout the United States and Europe.

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