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Graphene: A New Paradigm in Condensed Matter and Device Physics

By Professor of Physics E L Wolf

Oxford University Press, United Kingdom, 2016. Paperback. Book Condition: New. Reprint. 249 x 174 mm. Language: English . Brand New Book. The book is an introduction to the science and possible applications of Graphene, the first one-atom-thick crystalline form of matter. Discovered in 2004 by now Nobelists Geim and Novoselov, the single layer of graphite, a hexagonal network of carbon atoms, has astonishing electrical and mechanical properties. It supports the highest electrical current density of any material, far exceeding metals copper and silver. Its absolute minimum thickness, 0.34 nanometers, provides an inherent advantage in possible forms of digital electronics past the era of Moore s Law. The book describes the unusual physics of the material, that it offers linear rather than parabolic energy bands. The Dirac-like electron energy bands lead to high constant carrier speed, similar to light photons. The lattice symmetry further implies a two-component wave-function, which has a practical effect of cancelling direct backscattering of carriers. The resulting high carrier mobility allows observation of the Quantum Hall Effect at room temperature, unique to Graphene. The material is two-dimensional, but in sizes micrometers nearly to meters displays great tensile strength but vanishing resistance to bending. The book reviews theoretical...



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