

Optical Properties of Excited States in Solids | 2012 | Springer Science & Business Media, 2012 | Baldassare di Bartolo | 9781461530442 | 733 pages

Optical properties of solids! Mark Fox. p. cm. - (Oxford master series in condensed matter physics). Includes index. The wide-ranging optical properties observed in solid state materials can be classified into a small number of general phenomena. The simplest group, namely reflection, propagation and transmission, is illustrated in Fig. 1.1. This shows a light beam incident on an optical medium. One of the ways in which the atoms can be promoted into excited states prior to spontaneous emission is by the absorption of light. Luminescence can thus accompany the propagation of light in an absorbing medium. The light is emitted in all directions, and has a different frequency to the incoming beam. Luminescence does not always have to accompany absorption. Solid state physics part II. Optical Properties of Solids. M. S. Dresselhaus. 1. The optical properties of solids provide an important tool for studying energy band structure, impurity levels, excitons, localized defects, lattice vibrations, and certain magnetic excitations. In such experiments, we measure some observable, such as reactivity, transmission, absorption, ellipsometry or light scattering; from these measurements we deduce the dielectric function $\hat{\mu}(\omega)$, the optical conductivity $\hat{\sigma}(\omega)$, or the fundamental excitation frequencies. A photon can excite an electron from an occupied state in the valence band to an unoccupied state in the conduction band. This is called an interband transition and is represented schematically by the picture in Fig. Optical Properties of Solids Second Edition. MARK FOX Department of Physics and Astronomy University of Sheffield. 1. The book presupposes that the reader has a working knowledge of solid-state physics at the level appropriate to a third-year undergraduate, such as that found in H.M. Rosenberg's *The solid state* (Oxford University Press, third edn, 1988). This puts the treatment at about the same level as, or at a slightly higher level than, that given in the *Introduction to solid state physics* by Charles Kittel. The wide-ranging optical properties observed in solid-state materials can be classified into a small number of general phenomena. The simplest group, namely reflection, propagation, and transmission, is illustrated in Fig. Gives an introduction to the optical properties of solids, including many new topics that have not been previously covered in other solid state texts at this level. Softcover available. Categories The book also necessarily presupposes a reasonable knowledge of electromagnetism and quantum theory. Classical and quantum arguments are used interchangeably throughout, and the reader will need to revise their own favourite texts on these subjects if any of the material is unfamiliar. 1.1 Classification of optical processes The wide-ranging optical properties observed in solid state materials can be classified into a small number of general phenomena. The simplest group, namely reflection, propagation and transmission, is illustrated in Fig.