<<原子和分子光谱学>>

图书基本信息

书名：<<原子和分子光谱学>>

13位ISBN编号：9787030313386

10位ISBN编号：7030313380

出版时间：2011-6

出版时间：科学出版社

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页数：588

内容概要

A wide-ranging review of modem spectroscopic techniques such as X-ray, photoelectron, optical and laser spectroscopy, and radiofrequency and microwave techniques. On the fundamental side the book focuses on physical principles and the impact of spectroscopy on our understanding of the building blocks of matter, while in the area of applications particular attention is given to those in chemical analysis, photochemistry, surface characterisation, environmental and medical diagnostics, remote sensing and astrophyscis. The Fourth Edition also provides the reader with an update on laser cooling and trapping, Bose-Einstein condensation, ultra-fast spectroscopy, highpower laser/matter interaction, satellitebased astronomy and spectroscopic aspects of laser medicine.

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书籍目录

章节摘录

版权页：插图：9.1.3 Excitation MethodsSeveral different excitation schemes can be used in laser spectroscopy. This is illustrated in Fig. 9.1 for the case of alkali atoms.Single-Step Excitation. Atoms are transferred directly from the ground state to the excited state using an allowed electric dipole transition. This means an S-P transition for an alkali atom.Multi-Step Excitation. Since tunable lasers have high output powers enabling the saturation of optical transitions, stepwise excitation via short-lived intermediate states is possible. A two-step process has been indicated in the figure. For an alkali atom this may mean S-P-D transitions. Stepwise excitations give access to states that cannot normally be reached.Multi-Photon Absorption. At high laser powers higher-order optical absorption processes become non-negligible. Thus, it becomes possible for an atom to simultaneously absorb two photons, thus bridging energy differences between two states without utilizing real intermediate states. The theory of two-photon absorption processes was presented by M. Goeppert-Mayer as early as 1931, but only in 1961。 could such transitions be observed with lasers.

编辑推荐

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