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2.5.1 Absorption rate deduced from a semiclassical treatment of the field2.5.2 Physical discussion. Relaxation time and correlation time; 2.5.3 Sketch of a quantum treatment of the absorption process; 2.5.4 Extension to spontaneous emission; 2.6 Two-level atom interacting with a coherent monochromatic field in the presence of damping; Light: a source of information on atoms; Introduction; 3. Optical methods; 3.1 Introduction; 3.2 Double resonance; 3.2.1 Principle of the method; 3.2.2 Predicted shape for the double resonance curve; 3.2.3 Experimental results
3.2.4 Interpretation of the Majorana reversal3.3 Optical pumping [Kastler (1950)]; 3.3.1 Principle of the method for a Jg = 1/2 Je = 1/2 transition; 3.3.2 Angular momentum balance; 3.3.3 Double role of light; 3.4 First experiments on optical pumping; 3.5 How can optical pumping polarize atomic nuclei?; 3.5.1 Using hyperfine coupling with polarized electronic spins; 3.5.2 First example: optical pumping experiments with mercury-199 atoms; 3.5.3 Second example: combining optical pumping with metastability exchange collisions for helium-3
3.5.4 A new application: magnetic resonance imaging of the lung cavities

Sommario/riassunto

This book presents a comprehensive overview of the spectacular advances seen in atomic physics during the last 50 years. The authors explain how such progress was possible by highlighting connections between developments that occurred at different times. They discuss the new perspectives and the new research fields that look promising. The emphasis is placed, not on detailed calculations, but rather on physical ideas. Combining both theoretical and experimental considerations, the book will be of interest to a wide range of students, teachers and researchers in quantum and atomic physics.