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Progress in Optics

Volume 8, 1970, Pages 133-200

III Light Beating Spectroscopy

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[https://doi.org/10.1016/S0079-6638\(08\)70188-4](https://doi.org/10.1016/S0079-6638(08)70188-4)

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Publisher Summary

This chapter discusses light beating spectroscopy, which is a direct analog of the familiar mixing of a.c. electrical signals in nonlinear circuit elements. The aspect of light beating spectroscopy, the mixing of two narrowband optical components which produces an a.c. component in the photocurrent at the optical difference frequency, is extensively employed in the analysis of the mode structure of lasers. When light is diffracted by ultrasonic waves in a fluid, the diffraction maxima contain components whose frequency is shifted from that of the incident light by integral multiples of the ultrasonic frequency. The shifts are measured by mixing the diffracted light with the incident laser light. The light, which is scattered from a fluid, has spectral components which are shifted in frequency from the incident light by inelastic photon-phonon scattering. Light, which is scattered by small impurities in a moving fluid, will be Doppler shifted by an amount proportional to the local fluid velocity.

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