Abstracts

Correlation of Low-Frequency Intensity and Frequency Fluctuations in GaAlAs Lasers

A. Dandridge and H.F. Taylor. "Correlation of Low-Frequency Intensity and Frequency Fluctuations in GaAlAs Lasers." 1982 Transactions on Microwave Theory and Techniques 30.10 (Oct. 1982 [T-MTT] (Special Issue on Optical Guided Wave Technology)): 1726-1738.

The intensity and frequency noise in single-mode GaAlAs lasers have been measured and the correlation between these instabilities investigated. The measurements were made over the range from 10 Hz to 25 kHz in CSP, TJS, and BH laser structures. It is found that the coherence function for frequency noise and intensity noise from one facet is near unity at the lasing threshold, decreases rapidly with decreasing current below threshold, and also decreases, but more slowly, as the current is increased above threshold. Qualitatively similar behavior is found for the correlation between intensity noise from the two laser facets. Junction voltage fluctuations are not correlated with the other types of noise, except when longitudinal mode hopping is occurring A model in which both intensity and frequency noise are related to local current variations and optical backscattering in the diode active region is developed to explain the results.

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