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Temperature Measurements 7.4.6. Various Dependences of Diode Laser Mirror Temperatures References 8. Novel Diagnostic Laser Data for Mirror Facet Disorder Effects, Mechanical Stress Effects and Facet Coating Instability Introduction 8.1. Diode Laser Mirror Facet Studies by Raman 8.1.1. Motivation 8.1.2. Raman Microprobe Spectra 8.1.3. Possible Origins of the 193 cm-1 Mode in (Al)GaAs 8.1.4. Facet Disorder - Facet Temperature - Catastrophic Optical Mirror Damage Robustness Correlations 8.2. Local Mechanical Strain in Ridge-Waveguide Diode Lasers 8.2.1. Motivation 8.2.2. Measurements - Raman Shifts and Stress Profiles 8.2.3. Detection of "Weak Spots" 8.2.4. Stress Model Experiments 8.3. Diode Laser Mirror Facet Coating Structural Instability 8.3.1. Motivation 8.3.2. Experimental Details 8.3.3. Silicon Recrystallization by Internal Power Exposure 8.3.4. Silicon Recrystallization by External Power Exposure - Control Experiments References 9. Novel Diagnostic Data for Diverse Laser Temperature Effects, Dynamic Laser Degradation Effects and Mirror Temperature Maps Introduction 9.1. Thermoreflectance Microscopy for Diode Laser Diagnostics 9.1.1. Motivation 9.1.2. Concept and Signal Interpretation 9.1.3. Reflectance - Temperature Change Relationship 9.1.4. Experimental Details 9.1.5. Potential Perturbation Effects on Reflectance 9.2. Thermoreflectance versus Optical Spectroscopies 9.2.1. General 9.2.2. Comparison 9.3. Lowest Detectable Temperature Rise 9.4. Diode Laser Mirror Temperatures by Micro-Thermoreflectance 9.4.1. Motivation 9.4.2. Dependence on Number of Active Quantum Wells 9.4.3. Dependence on Heat Spreader 9.4.4. Dependence on Mirror Treatment and Coating 9.4.5. Bent-Waveguide Non-Absorbing Mirror 9.5. Diode Laser Mirror Studies by Micro-Thermoreflectance 9.5.1. Motivation 9.5.2. Real-Time Temperature-Monitored Laser Degradation 9.5.3. Local Optical Probe 9.5.3.1. Threshold and heating distribution within near-field spot 9.6. Diode Laser Cavity Temperatures by Micro-Electroluminescence 9.6.1. Motivation 9.6.2. Experimental Details - Sample and Setup 9.6.3. Temperature Profiles along Laser Cavity 9.7. Diode Laser Facet Temperature - Two-Dimensional Mapping 9.7.1. Motivation 9.7.2. Experimental Concept 9.7.3. First Temperature Maps Ever 9.7.4. Independent Temperature Line Scans Perpendicular Active Layer 9.7.5. Temperature Modelling References Index.

Sommario/riassunto

"This reference book provides a fully integrated novel approach to the development of high power, single transverse mode, edge-emitting diode lasers by addressing the complementary topics of device engineering (Part 1), reliability engineering (Part 2) and device diagnostics (Part 3) in the same book in altogether nine comprehensive chapters, and thus closes the gap in the current book literature.Diode laser fundamentals are discussed, followed by an elaborate discussion of problem-oriented design guidelines and techniques, and by a systematic treatment of the origins of laser degradation and a thorough exploration of the engineering means to address for effective remedies and enhanced optical strength. The discussion covers also stability criteria of critical laser characteristics and key laser robustness factors. Clear design considerations are discussed in the context of reliability engineering concepts and models, along with typical programs for reliability tests and laser product qualifications. A final extended part of novel, advanced diagnostic methods covers in detail, for the first time in book literature, performance- and reliability-impacting factors such as temperature, stress and material instabilities.Further key features include: Furnishes comprehensive practical design guidelines by considering also reliability related effects and key laser robustness factors, and discusses basic laser fabrication and packaging issues. Discusses in detail diagnostic investigations of diode lasers, the

	fundamentals of the applied approaches and techniques, many of them pioneered by the author to be fit-for-purpose and novel in the application. Provides a systematic insight into laser degradation modes such as catastrophic optical damage, and covers a wide range of technologies to increase the optical strength of diode lasers. Discusses basic concepts and techniques of laser reliability engineering, and provides for the first time in a book details on a standard commercial program for testing the reliabity of high power diode laser. Semiconductor Laser Engineering, Reliability and Diagnostics reflects the extensive expertise of the author in the diode laser field both as a top scientific researcher as well as a key developer of highly reliable devices. It features two hundred figures and tables illustrating numerous aspects of diode laser engineering, fabrication, packaging, reliability, performance, diagnostics and applications, and an extensive list of references to all addressed technical topics at the end of each chapter. With invaluable practical advice, this novel reference book is suited to practising researchers in diode laser technologies, and to postgraduate engineering students. "--

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