

## **Semiconductor lasers a key element for new generation of optoelectronic systems**

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Photonics is a fascinating inter-disciplinary scientific endeavor that has transformed the nature and capability of telecommunication, data transmission and storage, and is thereby transforming the society in which we live. During the last decade, photonics has transformed information and communication technologies through developments at the level of discrete components and lumped systems. Striking examples are high-speed, long-distance point to point fibre communication and high density CD and DVD-based data storage. The next decade is expected to see major developments in metropolitan and local optical communications and in integration of photonics at the level of individual components or even integrated circuits. Semiconductor laser is a key element for different photonics devices. We report the results of numerical and experimental investigations of the dynamical behaviour of different types of semiconductor lasers. Very encouraging agreement between the results of numerical calculations and the experimental data is demonstrated. We have identified the nature of the bifurcation that occurs in the device dynamics. Finally, we have studied the influence on laser dynamics of device and material parameters.

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