**Quantum Laser diodes, market place, the know-how of design and fabrication technology, applications and Challenges**

**Abstract:**

Laser Diode market showed significant growth in the past three years due to high demand from electronic manufactures and materials processing companies [1]. The main winners on the technology side were fiber lasers, light sensing-ranging (lidar) lasers, and vertical-cavity surface-emitting lasers (VCSELs). An estimate increase of 11% market place this year for diode lasers alone compared with last year market. Last year laser market was at 12.43 B$US with 44% for diode lasers alone and the rest are none diode lasers [2]. Tuneable InP/ GaAs based multiple quantum well (AMQW) laser is a key driver [3] and a ground base for this technology and market. In this presentation, I will talk about the laser diode market place for the last five years and the future forecast for this technology. The laser design technology and the knowledge of fabrication techniques will be explained. The applications and challenges of improving laser diode design, fabrication and quality production will be discussed. A commercially available partial differential equation solver, FlexPDE, was used to solve the main equations of electron current, and thermal heat distribution [4] of these devices while a custom design C++ based code was used to solve the optical wave equation to design the optical active area. Simulation results and experimental date will be shown in the presentation [4-7].

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