

Master 2013

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**Characterization of Optical and Thermo-mechanical Properties of
Quantum-cascade-laser.**

ABSTRACT - Masterthesis

The goal of this study was to characterise the optical and thermo-mechanical properties of quantum cascade lasers (QCLs). The problem of a shifting beam centre which occurred in an experimental measurement device at Optoprecision GmbH should be investigated in terms of scale and origin. Furthermore an automated measuring set-up should be built up for measuring the beam profile as a function of the laser temperature.

An intensive examination of QCLs has contributed to the understanding of their functionality. During this work different measuring set-ups have been realized which among others automatically measure the beam profile of QCLs. QCLs of the two manufacturer nanoplus GmbH and Alpes Lasers SA were regarded in detail. As a result a dependency of the direction of the beam centre on the laser's temperature was proven. This behaviour was traced back to the package structure and the deformation of the Peltier element.