

**Master 2015**

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**Concept Development and Realization of a Broad-Band Laser Light Source using Non-Linearities.**

***ABSTRACT - Masterthesis***

This work introduces an alternative automotive laser lighting concept to the currently in use laser headlamp devices. The system described in here is a coherent broad-band laser light source, which could be used for different applications in the automotive industry, especially in headlamps. As a part of this work the system has been chosen by evaluation out of different approaches. After the consideration of the arrangement type, a laboratory setup has been developed and realized in order to prove the functionality of the broad-band laser light source.

By designing a MATLAB program the emitted colour position could be investigated. Further research has shown the polarization properties of the system, the spectral properties and the impact of different pump powers. An essential result is the demonstration of simultaneous red, green and blue (RGB) spectral line emission. Due to RGB it is possible to generate a white light emission, which is allowed to be used in headlamp applications. In addition to this it is shown that diverse fiber lengths and different pump powers result into varying emitted spectra, thus into dynamic changeable colour positions. Therefore this work introduces an applicable alternative for the automotive industry for headlamp systems or ambient interior lighting constructions, which has the potential for a new technology based on the results of this thesis.