



2 Master projects

Miniaturized light sources for digital holography

Optical resonators can increase the power of incident laser light by orders of magnitude. We achieve a particularly strong power enhancement with micro-optical whispering gallery resonators. Here, light travels via total internal reflection for up to 10 million roundtrips before it is “lost”. Based on these devices, we have developed miniaturized lasers outperforming the state of the art under laboratory conditions. However, are they useful for applications in the industrial environment?

In order to find this out, we have picked a very fascinating field: digital holography. This enables the user to identify sub-micrometer structures on industrially fabricated parts and display them in 3D in order to spot production defects. Well-known manufacturers from microelectronics and e-mobility are highly interested in this technology, where the light source is the key component.

We are looking for two Master students for this project in which we combine two fascinating fields of research: laser development and holography. The main tasks are:

- Realization of whispering gallery based lasers
- Characterization of laser operation and comparison with the state of the art
- Testing different laser sources for digital holography using practical samples



Left: Whispering-gallery based laser, **Center:** Holography system for industrial applications, **Right:** Holographical analysis of a practical component

When you are interested, please contact:

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