# Seminarankündigung

## Dienstag, 7. September 2021
## 13:00 Uhr

**ONLINE via ZOOM**

https://tum-conf.zoom.us/j/63946955441
Meeting-ID: 639 4695 5441
Kenncode: 942961

# “Towards supersensitive optical phase measurement using deterministically generated multi-photon entangled states”

When light passes through a thin transparent medium, it gains a phase that usually depends on the width of the film, its refractive index, birefringence. Measuring this phase with high precision is beneficial for many technological applications, such as in phase-contrast microscopy. It has been suggested that entangled light can provide better accuracy in phase measurement compared to classical light. Using $\mathrm{N}$ independent photons, the error in the phase scales as shot noise, $1\backslash\sqrt{\mathrm{N}}$, while entangling the photons in a GHZ state provides the ultimate precision of $1\backslash\mathrm{N}$, a factor of $\sqrt{\mathrm{N}}$ better. In my talk, I will describe how we generate a photonic GHZ state using an anchored spin in a self-assembled semiconductor quantum dot. I will present a demonstration where we use the GHZ state to enhance precision in a phase measurement. Since our entanglement production is deterministic, our method is the most promising to be scaled up to many entangled photons, where the precision gain becomes significant.

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