

Masterthesis / Research Assistant

» Design and Implementation of a Josephson Traveling Wave Parametric Amplifier for Entangled Quantum Microwave Beam Generation«

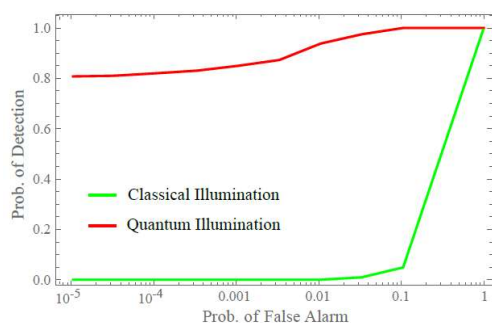
The research group

Circuit and System Technology

offers a

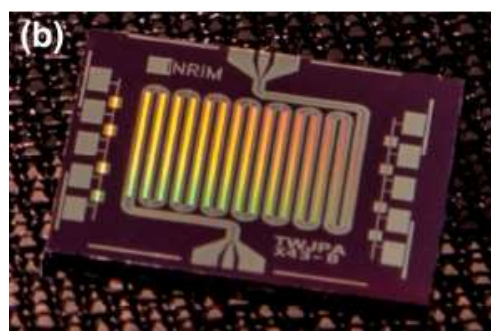
Masterthesis/ Student Job

Radar systems based on microwave quantum illumination (MQI) offers several advantages compared to classical radar systems like higher SNR, robustness against noise and interferers and a higher probability of detection.



Comparison of the probability of detection vs. probability of false alarm of an MQI radar and classical radar [2].

A key component of such systems is the Josephson parametric amplifier (JPA) which generates the entangled microwave beam. Within this work an improved version of this devices, the so called Josephson traveling wave parametric amplifier (JTWPA) shall be designed.



Microphotograph of a JTWPA [2].

Task Description:

Within this work a JTWPA shall be designed and prepared for fabrication. The workload includes:

- Literature research
- Design of a JTWPA
- Optimization of the JTWPA
- Adaption for fabrication

Requirements:

- Knowledge on quantum physics but not essential.
- Knowledge on Josephson junctions is advisable but not essential.
- Knowledge on JPA is advisable but not essential.

In case of interest, please send an E-Mail containing your latest transcript of records to (stkruse@hni.upb.de).

[1] D. Luong et al., "Microwave Quantum Radar: An Experimental Validation," 2018 International Carnahan Conference on Security Technology (ICCST), 2018, pp. 1-5

[2] P. Livreri et al., "Microwave Quantum Radar using a Josephson Traveling Wave Parametric Amplifier" 2021