

## JOB OFFER: POSTDOC POSITION IN NONLINEAR AND QUANTUM OPTICS

Ghent University – IMEC  
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### Context

The project consists in generating high bandwidth squeezed states using a four-wave mixing process involving two pump beams in silicon nanophotonics ICs. Squeezed states are quantum states of light showing sub-classical uncertainty on either phase or amplitude. Squeezed states generation has been demonstrated 3 decades ago using nonlinear optical processes in nonlinear crystals and optical fibres. Squeezers have received a renewed interest for their applications in quantum computing and communications. Their miniaturization has been reported using silicon nitride photonics. Silicon photonics promises a significant improvement of the miniaturization while reaching squeezing bandwidth fully exploiting the best detectors available. This work is supervised by prof. Stephane Clemmen and fits in a greater Weave project involving ID-lab (UGent), the Austrian Institute of technology, and the University of Vienna.

### Job description

The candidate will be responsible for the research work including modelling of the linear and nonlinear properties of the silicon ICs, the design of ICs, and a complete characterization of the ICs and the achieved squeezing. The candidate will collaborate with the group of prof. Xin Yin developing dedicated optical receivers. Responsibilities include:

- Performing research in an independent way
- Reporting on the research to supervisor and collaborators
- Communication to peers at conference and via journal publications
- A limited amount of teaching hours is foreseen (8 days/year of laboratory sessions or 10\*2 hours /year of exercises)

### Profile

At the starting time of the contract, the applicant must hold a PhD in physics, physics engineering or photonics engineering and fit the international mobility conditions (living and working outside Belgium more than 24 months over the past 3 years).

Good knowledge of optics and quantum mechanics are required.

Prior knowledge on squeezing, silicon photonics, nonlinear photonics are valuable assets and so is experience with experimental integrated optics and nonlinear photonics.

Knowledge of English both written and spoken are essential.

### Salary and benefits

The net salary is at minima 2633€. Benefits include mandatory health insurance, laptop, travel to conferences and a moving allowance covering the cost of the first month rent up to 850€ ([more informations](#)). The contract is for an initial duration of 1 year with a foreseen extension up to 3 years in total.

### About the Photonics Research Group (PRG)

The project will take place primarily at the University of Ghent in the photonics research group (PRG). PRG has pioneered the field of integrated photonics for the past two decades and hosts a fully equipped measurement infrastructure (equipped with single photon detectors, higher power lasers, ...), a cleanroom facility, and an

extensive simulation infrastructure. The group hosts 11 professors, 14 postdocs and 50+ PhD students from many nationalities.

## Application

The position is open as of February 2022 and until the right candidate is selected (evaluations are performed as they are received). To apply, submit to Stéphane Clemmen by [email](#):

- your CV
- a cover letter highlighting the expertise you already have and the one you currently miss for this project
- academic reference(s)

Feel free to indicate your interest prior to your formal application in case of timing is an issue.

## More information

Prof. Stéphane Clemmen ([stephane.clemmen@UGent.be](mailto:stephane.clemmen@UGent.be))

## Reading

- A. Dutt et al., Phys. Rev. Applied, 3 (4) pp. 044005, [2015]
- Z. Vernon et al., Phys. Rev. Applied 12 (6), pp. 064024, [2019]
- S. Clemmen et al., Optics express, 17(19), pp. 16558 [2009]
- S. Ramelow et al., arXiv preprint arXiv:1508.04358.