

# Development of a full monolithic quantum simulator on the silicon photonics platform

Mon, 2021-08-23 17:58 - [lorenzo.pavesi](#) [1] **At:** Nanoscience Laboratory - University of Trento  
**Deadline:** 30 September, 2021

## Location

Department of Physics via Sommarive 14  
Povo (Trento) 38123 Italy

## Research aims:

The activity aims to develop an electronically programmable integrated photonic circuit capable to implement different quantum simulation protocols. The architecture foresees the monolithic integration of photon pair sources, pump rejection filters, reconfigurable quantum gates and single photon detectors. It is built on the silicon oxynitride platform and works at near infrared wavelengths (800 nm). The post-doc will be involved in the design of the photonic circuitry, from the single component level to more complex networks. The post-doc activities cover also the experimental test of their performance, which include the assessment of the main photon source metrics, the validation of the component loss and of their spectral response, the evaluation of the pump filter's rejection and the determination of the gates fidelity. The post-doc task also includes the mapping of quantum algorithms into photonic circuits and the analysis of their outputs.

The overall research objective is to develop a stand-alone electronic-photonic unit that is capable to run few-qubit simulation algorithms to tackle quantum chemistry problems.

The position is for two years and the working place is at the University of Trento (<https://www.unitn.it/> [2]). This activity is carried out in the framework of the European project EPIQUS (<https://epiqus.fbk.eu/> [3]).

## To apply, the following requirements are mandatory:

1. A PhD title in physics awarded by an Italian or foreign university, or an equivalent qualification obtained abroad; candidates who have finished their PhD thesis and will complete their PhD programme before the start date of the fellowship may also apply for selection, but proof of obtaining the qualification must be certified before the research programme start date
2. Good knowledge of the English language
3. Good theoretical background in integrated quantum nonlinear optics
4. Experience in design and modelling of integrated photonic devices
5. Solid background in experimental methods for quantum optics

If interested, send your CV or ask more information to Dr. Massimo Borghi ([massimo \[dot\] borghi \[at\] unitn \[dot\] it](mailto:massimo [dot] borghi [at] unitn [dot] it))

- [Postdoc](#) [4]

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