



PRESS RELEASE

Wave Photonics Leads Innovate UK-Funded Project to Develop Packaging Solutions for Quantum Photonic Integrated Circuits

CAMBRIDGE—[Wave Photonics](#) is leading an Innovate UK-funded project alongside partners, Alter Technology TUV NORD UK, Senko Advanced Components, University of Southampton and University of Bristol, to develop packaging solutions for Quantum Photonic Integrated Circuits (QPICs). The Quantum Photonic Integrated Circuit PACKaging (QPICPAC) project will develop a template-driven approach to minimise custom development requirements and costs for quantum technology companies.

QPICs are chips made using the same fabrication techniques that are used to make semiconductor chips for computers, but to make circuits that manipulate light. These types of chips are already being used for energy-efficient transceivers for data centres, LiDAR for autonomous vehicles and sensors for healthcare applications, but they are especially useful for quantum technologies.

Typically, demonstrations of quantum photonics technologies like trapped ion computing or quantum secure communication use bulky, expensive optical setups which aren't suitable for mass production. As QPICs are made using scalable semiconductor fabrication processes, they can be made reliably at high volume and are key for making quantum technologies manufacturable at scale. However, the route from a chip design to a finished product is not simple. A key issue is packaging – getting light on and off the chip, as well as making sure that the end device is suitable for the environment in which it will be deployed. Currently, this is a bespoke process, which means that it is slower to develop and more expensive than it needs to be.

The goal of the QPICPAC project is to develop design templates and components to minimise the amount of bespoke work needed, meaning that packaging will be simpler and more affordable for those seeking to exploit QPIC technologies.

Quantum Dice, a UK start-up developing QPIC-based quantum random number generators will be acting as a trial customer for the project to provide insights into the needs of quantum photonics companies intending to make products in high volume.

Jiangbo Zhu, Senior Photonics Engineer at Wave Photonics, said, "Having worked on integrated photonics for over a decade, it's thrilling to see the pace that quantum photonics is progressing. I'm looking forward to working with the consortium to develop solutions to help accelerate the already rapid progress in the QPIC industry."

Rob Roach, Business Development Manager at Alter, said, “This project offers a unique opportunity to bring together representatives of all the stake holders in the quantum PIC world and push forward in the UK the commercialisation of quantum technology.”

Bernard Lee, Director of Technology and Innovation, said, “Working on this project brings back memories of my days as a researcher in the UK and I am thrilled to have this opportunity again. SENKO has been actively involved in many international standards and industrial bodies and through QPICPAC, we hope to introduce the very best in leading edge optical interconnect technology to this project.”

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About Innovate UK

Innovate UK drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas.

We connect businesses to the partners, customers and investors that can help them turn ideas into commercially successful products and services and business growth.

We fund business and research collaborations to accelerate innovation and drive business investment into R&D. Our support is available to businesses across all economic sectors, value chains and UK regions.

Innovate UK is part of UK Research and Innovation. For more information visit www.innovateuk.ukri.org

About Wave Photonics

Wave Photonics is Cambridge-based start-up that is using computational techniques to accelerate integrated photonics design. Integrated photonics is a scalable technology that is currently largely used in datacomms, but has the potential to be used as a platform for upcoming technologies such as quantum computing and communication, healthcare and biosensing, lidar and sensing. However, the lack of readily-available libraries of photonics components and the difficult of accounting for process imperfections means that entrants to these markets face high barriers to product development. Wave Photonics is developing tools to automatically account for process imperfections and develop high-quality, robust libraries of components to enable photonic chip designers to rapidly develop and scale their products.

About Alter Technology TUV NORD UK

Alter Technology TUV NORD UK is part of the Alter Technology Group, which is the leading provider of micro and optoelectronics services in engineering, procurement, assembly, and test in space and harsh environment markets. Alter Technology TUV NORD UK provides contract package design and precision assembly services for a wide range of optoelectronic, microelectronic and MEMS devices. Our expertise in semiconductor packaging solutions spans the full product life-cycle: from design through prototyping, process optimisation, product qualification, failure analysis, volume manufacturing and transfer to low-cost volume manufacture. We specialise in high reliability applications in the space, quantum, aerospace and defence sectors, with our Photonics Design Centre focusing on supporting

the Group's development of highly integrated, miniaturised and robust photonic products for the Quantum market, Positioning, Navigation and Timing Systems and Photonic based Satellite optical communications.

About Senko Advanced Components

Senko Advanced Components is a wholly owned subsidiary of the SENKO Advance, which is headquartered in Yokkaichi, Japan, with 16 locations globally, and dozens of design and manufacturing facilities providing local support to customers all around the globe. SENKO was incorporated in the United States in the early nineties, and it has since been recognized as one of the industry's specialists in passive fiber optics interconnect and optical components. SENKO's reputation is due in large part to its full vertical integration from the design capabilities, qualification/testing, and manufacturing. To date, SENKO has deployed over 800 million connectors, and it has over 150 awarded patents, with more than 300 pending

About CORNERSTONE at the University of Southampton

CORNERSTONE is a license free, open-source Silicon Photonics rapid prototyping foundry based at the University of Southampton, UK. The prototyping platform uses industry-compatible, deep-UV projection lithography meaning you can seamlessly scale up production volumes via your favourite commercial foundry. The platform retains device-level innovation capability and flexibility in its process flows, making it the perfect choice for researchers who want to try out innovative designs or evaluate new photonic circuits. [Find out more.](#)

About the University of Bristol

The [Photonics & Quantum research group](#) in the Department of Electrical and Electronic Engineering is one of the leading UK photonics research groups with expertise in device fabrication, design and characterisation. The group is involved in a wide range of activities including fundamental semiconductor physics, quantum photonics, nanofabrication, RF applications and biophotonics.