Introducing the largest quantum photonic processor to date
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“Quantum sampling machines based on light are believed to be very promising for showing a quantum advantage,” reports a news item posted on the QuiX Quantum website. "The problem of drawing samples from a probability distribution, mathematically too complex for a classical computer, can be solved easily by letting light propagating [sic] through such quantum sampling machines. At the very core of quantum sampling machines there are large-scale linear optical interferometers, i.e. photonic processors.”

A look at the chip

The processor the research team developed is a "record-size" 20-mode silicon nitride photonic chip that is optimized for use at the near-infrared wavelength range, operating at a wavelength of 925 nanometers. According to a webinar video presenting the processor, the 20 input modes with 190 unit cells and 380 tunable elements likely make this processor the most complex photonic chip available today. Besides the large number of modes, key features of the quantum photonic processor include low optical losses (of 2.9 decibels per mode) and high fidelity (99.5 % for permutation matrices and 97.4 % for Haar-random matrices). The turnkey processor also enables high-visibility quantum interference (98 %).

Prof. Fabio Sciarrino says, “The established high-performance photonic technology provided by QuiX Quantum is crucial for the success of the project as it addresses the need of science-to-technology transition needed for developing useful quantum computation.” The project brings together seven partners from France, Italy, the Netherlands and Portugal: five academic and research organizations and two industrial players, all European leaders in the field of quantum information processing and integrated photonics.

More information: PHOQUSING project website: www.phoqusing.eu/