

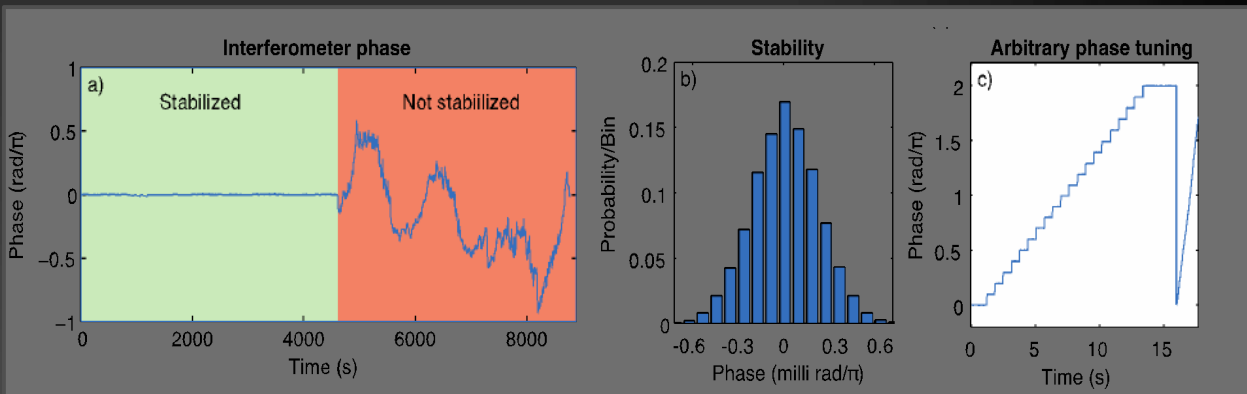
KiAVE - Redefining optical sensing

Ki3 PHOTONICS
Technologies

Phase readout and stabilization of fiber-based interferometers

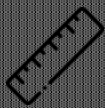
For an optimum accuracy, quantum measurement systems that make use of optical interferometers need to implement stabilization approaches.

Kiave comprises an unbalanced fiber-based interferometer that integrates a phase readout and stabilization system, guaranteeing long-term phase stability, and enabling the precise determination of phase, allowing for unprecedented stability in both short- and long-term fiber interferometer operations.



a) Interferometer phase for stabilized and non-stabilized case. b) Phase stability up to $0.0002 \text{ rad}/\pi$. c) Arbitrary phase tuning across $0-2\pi$.

KEY APPLICATIONS



Optical Metrology



Quantum Cryptography



Academic Research

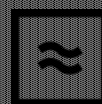


Demonstration and
Technology Evaluation

KEY BENEFITS



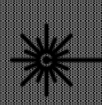
Accurate phase
extraction



Phase independent
stability across $0-2\pi$



Continuous, stable
phase control



Can be used with
pulsed/CW laser schemes

Kiave - interferometric stabilization system

Ki3 PHOTONICS
Technologies

The demonstrated phase readout and active stabilization of fiber-based interferometers is extremely attractive for its possibility to e.g. perform projection measurements on time-bin quantum entangled states in the telecom band - an essential element in the construction of quantum information systems (based on quantum key distribution, or QKD) and quantum information processing.



System description

Kiave meets all the requirements for an easy integration in fiber-based quantum experiments. Enclosed in a 19" rackmount the stabilization system is coupled to an external fiber-based interferometer.



Kiave – Interferometric phase readout and stabilization system



Key applications

Among the broad range of applications, **Kiave** can be critical for achieving time-bin entangled quantum stations. Thanks to a phase stability able to reach up to $0.0002 \text{ rad}/\pi$ it is an essential element to achieve quantum photonic supremacy. For example, **Kiave** has been critical in the generation of multiphoton entangled quantum states by means of integrated frequency combs as well as high-dimensional one-way quantum processing implemented on d-level cluster states (see ref. [1-2] for the details of experimental setup and methods).

[1] C. Reimer et al. Science, 351, 1176 (2016)

[2] C. Reimer et al. Nature Physics, 15, 148 (2019)

Phase stability	Up to $0.0002 \text{ rad}/\pi$ (for days)
Operating wavelength	1527.4 nm - 1600.8 nm
Interferometer imbalance	>2ns

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