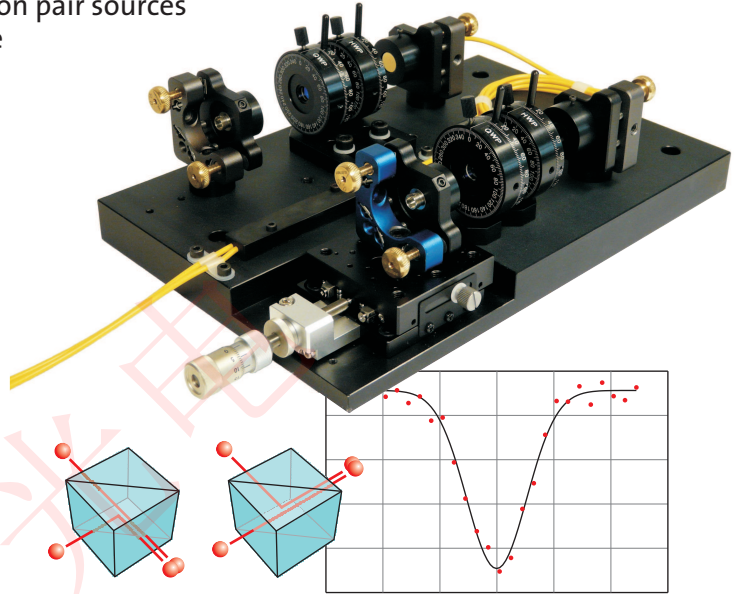

Two-photon Interferometer

Key features

- Quantum mechanics hands-on: Two-photon interference experiment
- Used with qutools' quED or your home-built photon pair sources
- Fiber-based and manually-driven, easy-to-operate

qu2PI is an education-oriented experimental module capable of demonstrating a quintessential quantum mechanical phenomenon – destructive interference of two indistinguishable photons at a non-polarizing beam-splitter. This phenomenon is often called Hong-Ou-Mandel interference. The experimental sign of the two-photon interference – the V-shaped drop or the 'dip' in the number of detected photon pairs towards zero – provides a measure of the time separation between the photon arrivals with femtosecond precision. Moreover, the depth of the dip is directly related to the degree of indistinguishability of the two photons.



Technology

qu2PI is fiber-based and manually driven. At its heart there is the polarization-maintaining fiber coupler providing high spatial and polarization overlap of the interfering photons. The all-fiber solution ensures not only a high quantum-interference visibility, but also greatly simplifies the search and alignment procedures. These procedures break down into separate deterministic steps, which are easily accomplished and do not require a lot of technical expertise. To record the interference dip, the path difference between the interferometer arms has to be scanned in micrometer-resolved steps. This is accomplished using the integrated manual translation stage equipped with a differential micrometer screw.

qu2PI main specifications

| | |
|--|---|
| Central Operating Wavelength | 810 nm |
| Interference Visibility ¹⁾ | with band-pass filters: > 80 % (typ. 90 %) w/o band-pass filters: > 60 % (typ. 80 %) |
| Interference-pattern Width ²⁾ | with band-pass filters: typ. 50 μm w/o band-pass filters: typ. 10 μm |
| Dimensions (H x W x D) | 90 x 366 x 200 mm |

1) Applies if used with qutools' quED Entanglement demonstrator.

2) Measured as full width at half maximum; applies if used with qutools' quED Entanglement demonstrator.