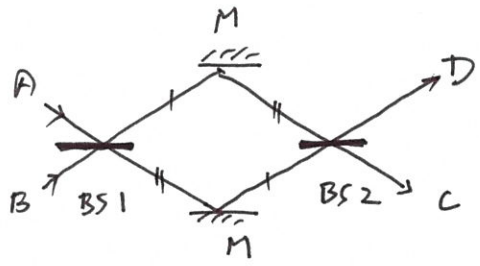
(BS)



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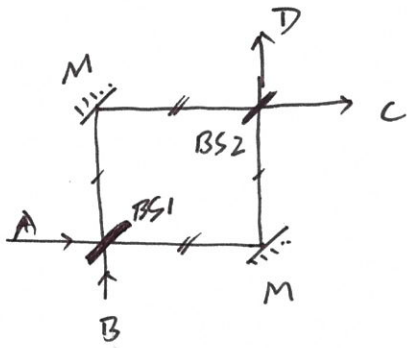


* With consideration of M, where
M induces π phase shift : $M = \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$; $e^{i\pi} = \cos\pi + i\sin\pi = -1$

$$\begin{pmatrix} D \\ C \end{pmatrix} = (BS2)(M)(BS1)\begin{pmatrix} A \\ B \end{pmatrix}\left(\frac{1}{2}\right)$$

$$= \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix}\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}\begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix}\begin{pmatrix} A \\ B \end{pmatrix}\left(\frac{1}{2}\right)$$

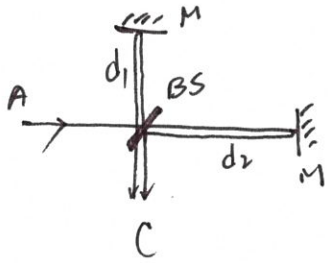
$$= \begin{pmatrix} -1 & -i \\ -i & -1 \end{pmatrix}\begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix}\begin{pmatrix} A \\ B \end{pmatrix}\left(\frac{1}{2}\right)$$

phase

$$= (-2i)\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} A \\ B \end{pmatrix} = (-2i)\begin{pmatrix} B \\ A \end{pmatrix}\left(\frac{1}{2}\right)$$

∴ $B=0$, $D=0$, $|C| = |A|$

(Michelson Interferometer) CH 8-1



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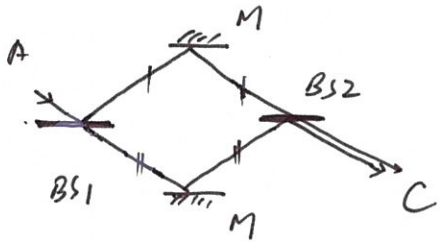

→ · B=0 case

* Regardless existance of π phase shift by Ms,

$|C| = |A|$: <u>constructive</u> interference if $d_1 = d_2$.

Coherence measurements with the two-photon Michelson interferometer

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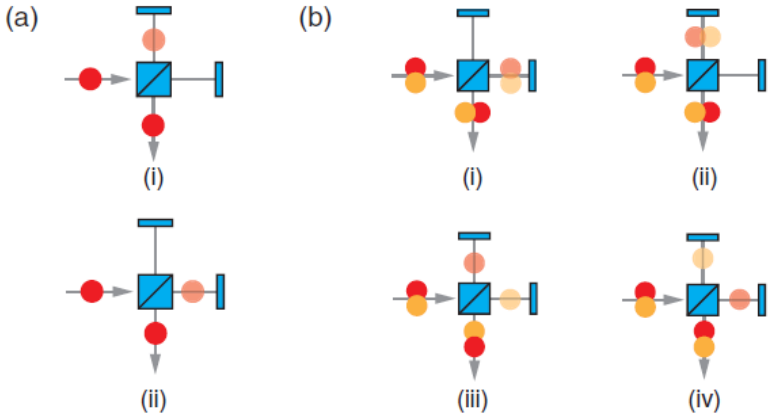

FIG. 4. (Color online) Interference of different photon paths in a (a) one-photon and (b) two-photon Michelson interferometer. In (a), a photon can travel along two different paths (i) and (ii). In (b), a pair of photons can travel along four different paths. Interference in coincidence counting occurs because of the indistinguishability of the different paths.

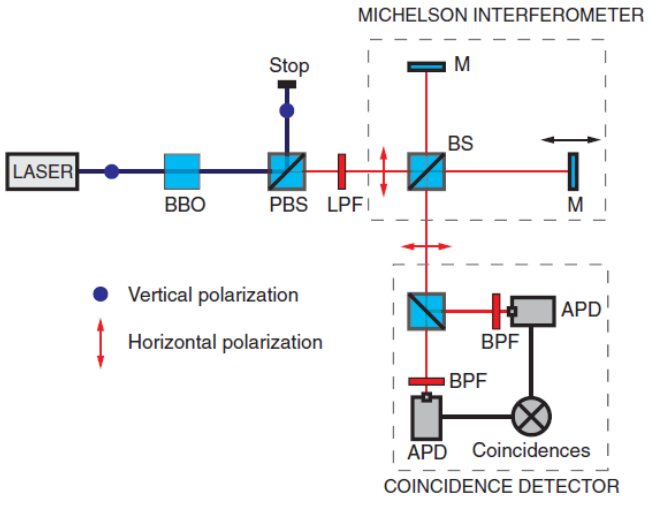

FIG. 5. (Color online) Experimental setup. BBO, β-barium borate crystal; PBS, polarizing beam splitter; LPF, longpass filters; BS, beam splitter; M, mirror; APD, avalanche photodiode; BPF, bandpass filters.

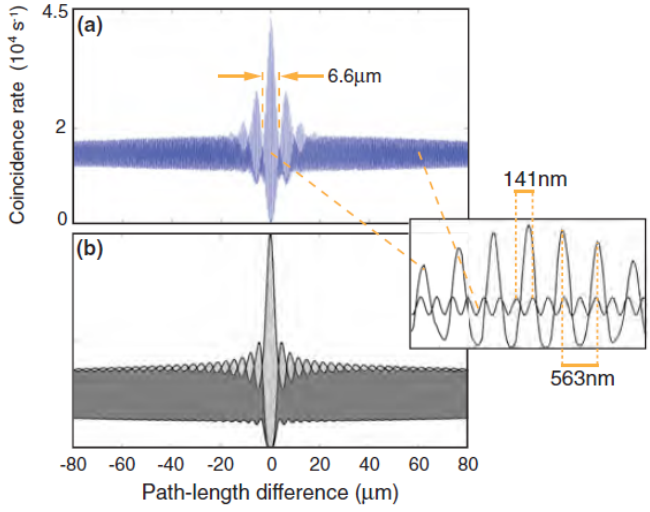

FIG. 7. (Color online) Measurements of the fourth-order interferogram of down-converted photons using 200 nm bandpass filters which produces a coherence length of 3.3 μm. (a) Measurements and (b) theoretical calculations. Compared to the first experiment, the degree of entanglement in the second experiment is higher.