Data set for
Pairing particles into holonomies

Vera Neef, Matthias Heinrich, Tom A.W. Wolterink, and Alexander Szameit

1. General Information

Dataset title:	Data set for Pairing particles into holonomies
Authors/Creators:	Vera Neef, Matthias Heinrich, Tom A.W. Wolterink, and Alexander Szameit*
Affiliation:	Institut für Physik, Universität Rostock, Albert-Einstein-Straße 23, 18059 Rostock, Germany.
E-Mail:	* alexander.szameit@uni-rostock.de
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2. Description

This document provides information to extract the data used and presented in the publication from the raw measurements, as well as structural information about the deposited files.

3. Structure

The subfolders contain raw data for measurement results that are presented throughout the Main Text and Supplementary Materials.

./Single and two photon measurements	This folder contains the central measurement data. Results from this measurement are depicted in: Fig. 3, Fig. 4, Table 1, Fig. S7, Table S2.
./Calibration measurements	All calibration measurements are collected here. The subfolders refer to the respective Figures and Tables where this data is presented.

/.Single and two photon measurements

This folder contains the raw click data associated with the experimental results in Fig. 3, Fig. 4, Table 1, Fig. S7 and Table S2 in the Main Text and Supplementary Materials.

File name convention: "Str" + <number of structure> + <input state>.

"Str1" refers to structure 1, which has a total propagation length of 80 mm. The propagation lengths increase in increments of 1/3 cm. Structure 7 has a total length of 100 mm. The geometry of all seven structures is depicted in Fig. S4.

The input states are labelled as photon number states in simplified Bra-Ket notation. For example, "1000" refers to the photon number state $|1000\rangle$, hence, a single photon is injected into the first waveguide. Likewise, "1100" refers to $|1100\rangle$ with one photon injected into the first and one in the second waveguide.

Data structure: The first column contains the channel in which a photon is being detected. The second column contains the number of time bins that have passed since the last photon was detected. Each time bin has a length of 164.61 ps. A coincidence click was defined as both photons being detected within 5 ns.

Single-photon measurements: The herald was sent through an external fiber. Only coincidences between signal and herald were analyzed.

Channel names:
0 – herald
1 – waveguide 1
2 – waveguide 2
3 – waveguide 3
4 – waveguide 4

Two-photon measurements: The outputs were split using fiber beam splitters; hence, each waveguide corresponds to two detection channels.

Channel names:
0 & 1 – waveguide 1
2 & 3 – waveguide 2
4 & 5 – waveguide 3
6 & 7 – waveguide 4

./Calibration measurements/Fig S5

This folder contains the coincidence counts of the Hong-Ou-Mandel measurements as depicted in figure S5 in the supplementary information. The file “Fiber_HOM.csv” contains the measurement in a fiber integrated beam splitter. The first column contains the time delay in ps. The second column contains the measured coincidence counts between both outputs. Columns have been separated by “;”.

./Calibration measurements/Fig S6

Two photons were launched into two different inputs of structure 7. A time delay was introduced between the two input photons and the coincidences between the two output photons were recorded. The files “Simultaneous_<input state>.csv” are labelled by the six possible input states. The first column contains the time delay in ps. The second column contains the measured coincidence counts between both outputs. Columns have been separated by “;”.