Data set for Observation of Anderson localization beyond the spectrum of the disorder

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1 General Information

Dataset title	Observation of Anderson localization beyond the spectrum of the disorder
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Date	2020/2021
Type	Measurements
Keywords	Anderson localization, Photonic lattices
Language	English
Rights	CC BY-ND 4.0
Download link	https://doi.org/10.18453/rosdok_id00003518

2 Description

This document serves as a guideline for the data repository of the publication [1]. The guideline concerns the acquisition and processing of measurement data as well as information about the deposited files.

3 Data Acquisition

The provided experimental data is obtained by time-resolved measurements of light pulse intensities within coupled optical fiber loops as described in [1]. The pulse intensities have been measured with a photodiode (Thorlabs DET01CFC). The output voltages of the photodiodes are amplified with a logarithmic amplifier (FEMTO HLVA-100) and then sampled by an oscilloscope (RS RTO1104). After reversing the logarithmic scaling and adjusting the zero-voltage baseline, the voltage values are mapped to the photonic lattice as described in [1]. This data corresponds to the field amplitudes $|u_n^m|^2$ up to a normalization factor.

4 File Format

The data is provided in an ASCII format (TXT-file) or as a binary file (MAT-file). One can read out individual files for instance with MATLAB via the command dlmread('filename') or load('filename').

5 Archive Structure

Filename	Description
Qsweep_00_200.txt Qsweep_00.mat Qsweep_020_1_200.txt Qsweep_020_1.mat Qsweep_020_2_200.txt Qsweep_020_2.mat Qsweep_020_3_200.txt Qsweep_020_3.mat Qsweep_020_4_200.txt Qsweep_020_4.mat Qsweep_040_200.txt Qsweep_040.mat Qsweep_060_200.txt Qsweep_060.mat Qsweep_080_200.txt Qsweep_080.mat Qsweep_095_200.txt Qsweep_095.mat	Mapped experimental data for $Q \in \{0, 0.2\pi, ..., 0.95\pi\}$ and initial width $n_{\mathrm{w}} = 50$ for a fixed disorder strength $A_{\mathrm{DS}} = 0.4$. Figure 4 in publication [1] is based on this data. In the filename, the first three digits indicate Q. For $Q = 0.2\pi$ the whole experiment was repeated four times, which yields the listed four files. Files that end with the number 200 in their filename, represent the data for the time step $m = 200$ with an additional baseline correction of the optical power. These are ASCII files with 100 rows, each containing an individual disorder realization for the specific value of Q. When the whole light propagation is required, one can use the other .mat files instead. They contain all time steps $m = 1...200$.
Q00_00.txt Q00_02.txt Q00_05.txt Q04_00.txt Q04_02.txt Q04_05.txt Q08_00.txt Q08_02.txt Q08_05.txt	Processed experimental data for $Q \in \{0, 0.4\pi, 0.8\pi\}$ and the different disorder strengths $A_{\mathrm{DS}} \in \{0, 0.2, 0.5\}$. The first two numbers indicate Q, whereas the last two numbers indicate A_{DS}. The ASCII files with $A_{\mathrm{DS}} \neq 0$ have 100 rows, each containing an individual disorder realization for the specific setting of Q and A_{DS}. The ACII files with $A_{\mathrm{DS}} = 0$ have only 1 row, as there are no different disorder realizations.

6 References

[1] A. Dikopoltsev, S. Weidemann, M. Kremer *et al.*, *Sci.Adv.* **8**, eabn7769 (2022). https://doi.org/10.1126/sciadv.abn7769