

# Data set for Nonlinear second-order photonic topological insulator

Experimental Data

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## 1. General Information

Dataset title: Data set for Nonlinear second-order photonic topological insulator

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## 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 structural information about the deposited files.

## 3. File Format

Provided is a zip archive (“Experimental Data.zip”) containing separate .mat files (MATLAB workspace) containing the observed output intensity patterns presented in the manuscript .

The file names encode the parameters as follows:

[Dimerisation of lattice]        ‘Dim0.2’ / ‘Dim0.45’ / ‘Dim0.5’ / ‘Dim0.55’ / ‘Dim0.8’

[Place of initial excitation]    ‘Bulk’ / ‘Topological Corner’ / ‘Trivial Corner’

Also contained are the power dependent state occupations calculated from the output intensity patterns.

Data format:

1st column:    injected peak power in MW

2nd column:    occupation ratio

Provided is a MATLAB function (“whitehot.m”) that generates the custom high-contrast color map used in all experimental intensity plots throughout the manuscript.

Also provided is a .txt file containing all waveguide spacings as well as coupling constants between waveguides for intracell coupling and intercell coupling for all dimerizations shown in the manuscript.

## 4. Archive Structure

### *Dim0.5\_Bulk.mat*

Variable Images	810x1082x18 double	Output intensity pattern in 18 slices of input power
Variable Power	1x18 double	Corresponding input powers [MW]

### *Dim0.5\_Corner.mat*

Variable Images	810x1082x23 double	Output intensity pattern in 23 slices of input power
Variable Power	1x23 double	Corresponding input powers [MW]

### *Dim0.45\_Dim0.55\_Bulk.mat*

Variable Images	810x1082x19 double	Output intensity pattern in 19 slices of input power
Variable Power	1x19 double	Corresponding input powers [MW]

### *Dim0.45\_Topo.mat*

Variable Images	810x1082x19 double	Output intensity pattern in 19 slices of input power
Variable Power	1x19 double	Corresponding input powers [MW]

### *Dim0.55\_Trivial.mat*

Variable Images	810x1082x20 double	Output intensity pattern in 20 slices of input power
Variable Power	1x20 double	Corresponding input powers [MW]

### *Dim0.2\_Dim0.8\_Bulk.mat*

Variable Images 803x1077x32 double Output intensity pattern in 32 slices of input power  
Variable Power 1x32 double Corresponding input powers [MW]

### *Dim0.2\_Topo.mat*

Variable Images 804x1078x16 double Output intensity pattern in 16 slices of input power  
Variable Power 1x16 double Corresponding input powers [MW]

### *Dim0.8\_Trivial.mat*

Variable Images 807x1080x35 double Output intensity pattern in 35 slices of input power  
Variable Power 1x35 double Corresponding input powers [MW]

### *Dim0.5\_Bulk\_Occupation.mat*

Variable OccRatio 18x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.5\_Corner\_Occupation.mat*

Variable OccRatio 23x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.45\_Dim0.55\_Bulk\_Occupation.mat*

Variable OccRatio 19x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.45\_Topo\_Occupation.mat*

Variable OccRatio 19x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.55\_Trivial\_Occupation.mat*

Variable OccRatio 20x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.2\_Dim0.8\_Bulk\_Occupation.mat*

Variable OccRatio 32x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.2\_Topo\_Occupation.mat*

Variable OccRatio 16x2 double  
Peak power [MW] | Occupation ratio

### *Dim0.8\_Trivial\_Occupation.mat*

Variable OccRatio 35x2 double  
Peak power [MW] | Occupation ratio

*whitehot.m* MATLAB function returns the custom high-contrast color map (256x3 double) used in all experimental intensity plots throughout the manuscript.

*Coupling\_values.txt* file contains all waveguide spacings and coupling constants between waveguides for all dimerizations shown in the manuscript.

## Bibliography

Marco S. Kirsch, Yiqi Zhang, Mark Kremer, Lukas J. Maczewsky, Sergey K. Ivanov, Yaroslav V. Kartashov, Lluís Torner, Dieter Bauer, Alexander Szameit, and Matthias Heinrich, "Nonlinear second-order photonic topological insulators," Nature Physics (submitted)