

# 1 Contents of folders and brief descriptions

- `./10_03_1550nm_pwrrecord.dat`: Contains power meter readings of the laser recorded at roughly 4 Hz over several hours. It is used for estimating laser stability.
- `./instrument_IDs.txt`: Contains the company serial numbers of all of the instruments used in the experimental setup.
- `./README.pdf`: This file.

## 1.1 `./1550_WSi3_R_spectra`

Contains reflectometry measurements off of the active areas of various device-dies on the 3-inch substrate wafer.

## 1.2 `./calibration`

Contains some NIST-calibration data for the calibrated power meter.

## 1.3 `./code`

- `./code/neo_calc_nonlinear.py`: Script that processes the data taken for nonlinearity calibration (all the files with `.dat` extension in folder `./neo_nonlinear_last`). The processed results are store in the same folder with extension `.analysis.neo.yaml`.
- `./code/neo_config.yaml`: Stores location of folders containing processed nonlinear-calibration files, switch-calibration files, and the folders containing detector counts measured for SDE estimation. It also contains the full path location of the NIST-calibration file. This file is used by `./code/neo_calc_nonlinear.py` and `./code/neo_sde_calculator.py`.
- `./code/neo_sde_calculator.py`: Script that processes the detector counts data (files with extension `.dat` in folders named `counts_last_*` and `flux_scan_*`). The output files are stored in the same folders, with suffixes `_de_analysis.neo.dat`. This script uses the NIST-calibration data for the power meter, the processed nonlinearity-calibration files, and the switch-calibration files if available.

- `./code/measurement_scripts`: Folder containing `python` scripts used to perform measurements in the experiment. Inoperable without the setup and instrument-control drivers. Provided for perusal.

#### 1.4 `./counts_last_2223, ./counts_last_2226, ./counts_last_2234`

Folders containing the detector counts measured at both count-minimized and count-maximized input-polarization settings for various wavelengths (files with extension `.dat`). Also contains SDEs in the processed files (suffix `_de_analysis.neo.dat`). The detector numbers 2223, 2226, and 2234 are designated as D1, D2, and D3 respectively in the manuscript.

#### 1.5 `./flux_scan_2223, ./flux_scan_2226, ./flux_scan_2234`

Folders containing the detector counts measured at various incident photon fluxes for wavelength 1550 nm (files with extension `.dat`). Also contains SDEs in the processed files (suffix `_de_analysis.neo.dat`). The detector numbers 2223, 2226, and 2234 are designated as D1, D2, and D3 respectively in the manuscript.

#### 1.6 `./neo_nonlinear_last`

Folder containing the nonlinearity correction measurements (extension `.dat`) as well as processed files (extension `.analysis.neo.yaml`) for a number of wavelengths.

#### 1.7 `./neo_run12`

Folder containing switch-calibration measurements for select wavelengths performed as a test 40 days prior to final detector measurements.

#### 1.8 `./neo_switch_calib_run14`

Folder containing switch-calibration measurements for various wavelengths performed during the final experiment.

#### 1.9 `./polscan_2223, ./polscan_2226, ./polscan_2234`

Folders containing the Bloch-sphere polarization scans and polarization-controller calibrations. The detector numbers 2223, 2226, and 2234 are designated as D1, D2, and D3 respectively in the manuscript.

### 1.10 `./pulse_traces`

Folder containing oscilloscope traces of both raw detection pulses as well as conditioned “square” pulses from detector number 2223 (designated as D1 in the manuscript).

### 1.11 `./timetagger_jitter_data`

Folder containing some time tagged arrival time data (measured using a HydraHarp 400) when the incident photons are derived from a pulsed laser. This was used for estimating timing jitter. The data is not presented as a plot in the manuscript. The code for generating a plot is present in the file named `plot_funcs.py` in the parent folder to this one.

### 1.12 `./WSi_nk`

Folder containing the transmittance and reflectance measurements (extension `.asc`) off of a 2.2 nm tungsten silicide film with a 2 nm amorphous silicon capping layer on top, all deposited onto a UV-fused silica substrate wafer. These were measured using a LAMBDA 1050 spectrophotometer. Also included is a file containing a refractive index (n, k) fit (extension `.dat`).

## 2 python virtual environment list of packages and version numbers

These are the packages and versions used for data processing and plotting. Please use this environment to reproduce the results in this manuscript.

Package	Version
python	3.7.3
algopy	0.5.7
AllanTools	2019.9
asteval	0.9.25
backcall	0.2.0
CODATA	1.2
cycler	0.10.0
decorator	5.0.9
et-xmlfile	1.1.0
future	0.18.2

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importlib-metadata	4.10.0
ipython	7.24.1
ipython-genutils	0.2.0
jedi	0.18.0
kiwisolver	1.3.1
lmfit	1.0.3
matplotlib	3.4.2
matplotlib-inline	0.1.2
numdifftools	0.9.40
numpy	1.20.3
openpyxl	3.0.9
packaging	21.3
pandas	1.3.5
parso	0.8.2
patsy	0.5.2
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
pip	21.1.2
pkg-resources	0.0.0
prompt-toolkit	3.0.18
ptyprocess	0.7.0
Pygments	2.9.0
pyparsing	2.4.7
python-dateutil	2.8.1
pytz	2021.3
PyYAML	6.0
qutip	4.6.2
scipy	1.6.3
setuptools	57.0.0
six	1.16.0
statsmodels	0.13.1
traitlets	5.0.5
typing-extensions	4.0.1
uncertainties	3.1.6
wcwidth	0.2.5
wheel	0.36.2
zipp	3.7.0

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