

# Overview\_FSs

September 26, 2022

```
[1]: from arpes.io import load_data
import os.path
```

```
C:\Users\hellbrue\Documents\Repositories\pyarpes\arpes\config.py:54:
UserWarning: Could not find local configuration file. If you don't have one, you
can safely ignore this message.
  warnings.warn(msg)

Activating auto-logging. Current session state plus future input saved.
Filename      : logs\unnamed_2022-09-26_15-47-04.log
Mode          : backup
Output logging : False
Raw input log  : False
Timestamping   : False
State         : active
```

## 1 Overview of FS maps of Bi2223 1. Beamtime at PSI

This notebook covers a broad overview of all FS maps measured at the 1. beamtime at PSI. On this beamtime only one sample of Bi2223 was measured. Additionally to the FS maps, “zoomed” in maps were measured with higher angular resolution.

### 1.1 FS maps of Bi2223

```
[2]: # Define directory
path = os.path.abspath("G:\My Drive\Bi2223\e19557\Box_1_square_renamed")

# Different parameters used to set up scans at SLS
scan_type = 'FS'
direction = '*'
phi = '*'
energy = '*'
polarization = '*'
temp = '*'
e_pass = '*'+'eVpass'
comment = ''
run = '*'.zfill(4)
```

```

# Put together string for finding file
parameters = [scan_type, direction, phi, energy, polarization, temp, e_pass,
↳comment, run]
if comment == '':
    parameters.remove(comment)
file_type = 'h5'
file_name = '_'.join(parameters)
file = '.'.join([file_name, file_type])

full_file = os.path.join(path, file)
file

```

```
[2]: 'FS_*_*_*_*_*_eVpass_000*.h5'
```

```

[3]: import glob
# Load all files with above specified parameters, * is a placeholder and
↳imports all files in its place
files = glob.glob(full_file)
print(len(files))
files

```

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```

[3]: ['G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_AN_P5_25eV_CIRCP_HT_10e
Vpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_AN_P5_25eV_CIRCP_LT_5eV
pass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_AN_P95_25eV_CIRCP_HT_10
eVpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_AN_P95_25eV_CIRCP_LT_5e
Vpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M40_26p5eV_CIRCP_LT_1
0eVpass_0001.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M40_26p5eV_CIRCP_LT_1
0eVpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M42_26p5eV_LHQ_LT_5eV
pass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M40_26p5eV_CIRCP_LT_1
0eVpass_0002.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M42_26p5eV_LHQ_LT_5eV
pass_0001.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M43_25eV_LHQ_LT_10eVp
ass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_M43_26p5eV_LHQ_LT_10e
Vpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCM_LT_1
0eVpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCM_LT_1

```

```

0eVpass_0001.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCP_HT_1
0eVpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCP_HT_1
0eVpass_0001.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCP_HT_1
0eVpass_0002.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCP_HT_1
0eVpass_0003.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCP_LT_1
0eVpass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_52eV_LHQ_LT_10eVp
ass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_52eV_LVLE_LT_10eV
pass_0000.h5',
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_LHQ_LT_10e
Vpass_0000.h5']

```

```

[4]: data_list = {}
for file in files:
    #data_list.append(load_data(file, location="ULTRA"))
    data = load_data(file, location="ULTRA")
    file_name = file.replace(path, '')[1:-3]
    data_list.update({file_name : data})

```

```

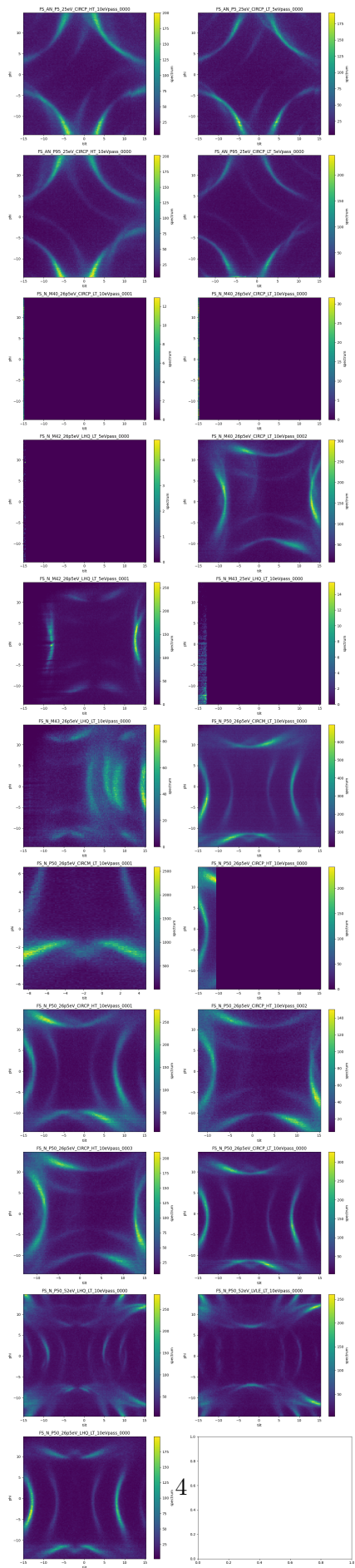
[5]: import matplotlib.pyplot as plt
import math
rows = math.ceil(len(data_list) / 2)
fig, ax = plt.subplots(rows, 2, figsize=(14, 6*rows))
fig.suptitle('Overview of Bi2223 FS 1. Beamtime', fontsize=20)

for key in data_list.keys():
    data = data_list[key].spectrum
    fs = data.sel(eV=slice(-0.02,0.02)).sum("eV")
    fs.plot(ax=ax.ravel()[list(data_list).index(key)])
    ax.ravel()[list(data_list).index(key)].set_title(f"{key}")

plt.tight_layout(rect=[0, 0.03, 1, 0.98])

```

### Overview of Bi2223 FS 1. Beamtime



## 1.2 Zoomed in FS maps with higher angular resolution

```
[6]: # Define directory
path = os.path.abspath("G:\My Drive\Bi2223\19557\Box_1_square_renamed")

# Different parameters used to set up scans at SLS
scan_type = 'FS'
direction = '*'
phi = '*'
energy = '*'
polarization = '*'
temp = '*'
e_pass = '*'+'eVpass'
comment = 'zoom'
run = '*'.zfill(4)

# Put together string for finding file
parameters = [scan_type, direction, phi, energy, polarization, temp, e_pass,
comment, run]
if comment == '':
    parameters.remove(comment)
file_type = 'h5'
file_name = '_'.join(parameters)
file = '_'.join([file_name, file_type])

full_file = os.path.join(path, file)
file
```

```
[6]: 'FS_*_*_*_*_*eVpass_zoom_000*.h5'
```

```
[7]: import glob
# Load all files with above specified parameters, * is a placeholder and
imports all files in its place
files = glob.glob(full_file)
print(len(files))
files
```

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```
[7]: ['G:\\My Drive\\Bi2223\\19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_LHQ_LT_5eV
pass_zoom_0000.h5',
'G:\\My Drive\\Bi2223\\19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCM_LT_5
eVpass_zoom_0001.h5',
'G:\\My Drive\\Bi2223\\19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_CIRCM_LT_5
eVpass_zoom_0000.h5',
```

```
'G:\\My Drive\\Bi2223\\e19557\\Box_1_square_renamed\\FS_N_P50_26p5eV_LHQ_LT_5eV  
pass_zoom_0001.h5']
```

```
[8]: data_list = {}  
for file in files:  
    #data_list.append(load_data(file, location="ULTRA"))  
    data = load_data(file, location="ULTRA")  
    file_name = file.replace(path, '')[1:-3]  
    data_list.update({file_name : data})
```

```
[9]: import matplotlib.pyplot as plt  
import math  
rows = math.ceil(len(data_list) / 2)  
fig, ax = plt.subplots(rows, 2, figsize=(14, 6*rows))  
fig.suptitle('Overview of Bi2223 FS 10eV Pass 1. Beamtime', fontsize=20)  
  
for key in data_list.keys():  
    data = data_list[key].spectrum  
    fs = data.sel(eV=slice(-0.02,0.02)).sum("eV")  
    fs.plot(ax=ax.ravel()[list(data_list).index(key)])  
    ax.ravel()[list(data_list).index(key)].set_title(f"{key}")  
  
plt.tight_layout(rect=[0, 0.03, 1, 0.98])
```

## Overview of Bi2223 FS 10eV Pass 1. Beamtime

