dopey dictionaries

2024.11.25

The data from prodigy is saved to a .xy file which is then loaded and sorted by the dopey.load() method for visualization and initial analysis.

Meta data

Meta data keys that are present in (almost) all dopey dicts:

file_name	string	The name of the loaded file.
spectrum_id	integer	An id set by Prodigy.
experiment	dict	Contains information about the measurement, such as lens mode, etc. See below.
type	string	Type of measurement as identified by dopey.
labels	dict	Labels for axes and intensity data. See below.

The experiment dict

This is an example of the experiment dict for a Fermi map measurement, i.e. a deflector map.

```
{'Version': '4.99.1-r110443',
 'Energy_Axis': 'Kinetic energy (eV)',
 'Count_Rate': 'Intensity (counts/s)',
 'Spectrum_ID': 13,
 'Analysis_Method': 'UPS',
 'Analyzer': 'PhoibosCCD',
 'Lens_Mode': 'WideAngleMode',
 'Scan_Mode': 'SnapshotFAT',
 'Curves_Per_Scan': 200,
 'Values_Per_Curve': 1,
 'Dwell_Time': 0.25,
 'Excitation_Energy': 24.0,
 'Ek': 7.29821,
 'Ep': 7.0,
 'Ordinate_Range': [-15.0, 15.0],
 'parameters': ['ShiftX [a.u.]'],
 'Column_labels': ['energy', 'counts/s']}
```

The labels dict

This is an example of the labels dict for the same measurement as above:

```
{'x': 'Kinetic energy (eV)',
 'y': 'Detector y-range',
 'z': 'X-Deflector (deg.)',
 'intensity': 'Intensity (counts/s)'}
```

Data

Data keys includes axes and intensity. E.g., an ARPES cut has two axes (x and y, where x is energy and y is analyzer angles) and a 2d intensity array, while a Fermi map has three axes (x, y, and z, where z is the deflector angle) and a 3d intensity array.

x	array	Axis (1d)
y	array	Axis (1d) *if applicable*
z	array	Axis (1d) *if applicable*
intensity	string	Array (1d, 2d, 3d)

Data types

dopey will try to identify what kind of measurement and data that is contained in the file when loaded and then sort the data accordingly. At the moment the following types of data can be identified (continuously updated):

Type	*Axes*		*Intensity*
xps	x	energy	[y, x]
	y	y-direction	
arpes	x	energy	[y, x]
	y	analyzer angle	
fermi_map	x	energy	[z, y, x]
	y	analyzer angle	
	z	deflector angle	
target_scattering_spectrum	X	energy	[x]
spin_edc (*)	x	energy	[p, scan, x]
	polarity	target magn. dir.	
spin_mdc (*)	x	energy	[p, scan, y, x]
	y	deflector angle	
	polarity	target magn. dir.	
spin_map (*)	x	energy	[p, scan, z, y, x]
	y	deflector angle 1	
	z	deflector angle 2	
	polarity	target magn. dir.	
spin_arpes	x	energy	[y, x]
	y	deflector angle	

For the three spin measurements spin_edc, spin_mdc, and spin_map there is an additional intensity key intensity_mean. This contains an intensity array with one dimension lower than intensity.

Dicts

xps

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	detector y-range
intensity	array (2d)	
labels	dict	

arpes

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	detector angle
intensity	array (2d)	
labels	dict	

fermi_map

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	detector angle
z	array (1d)	deflector angle
intensity	array (3d)	
labels	dict	

spin_edc

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy

polarity	array (1d)	
intensity	array (3d)	
intensity_mean	array (2d)	
labels	dict	

spin_mdc

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	detector angle
polarity	array (1d)	
intensity	array (4d)	
intensity_mean	array (3d)	
labels	dict	

spin_map

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	detector angle
z	array (1d)	deflector angle
polarity	array (1d)	
intensity	array (5d)	
intensity_mean	array (4d)	
labels	dict	

spin_arpes

file_name	string	
spectrum_id	integer	
experiment	dict	
type	string	
x	array (1d)	energy
y	array (1d)	deflector angle
intensity	array (4d)	
labels	dict	