Nanoscan M-Squared Automation

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class fitter.Fitter(x, y, xerror, yerror, func=<staticmethod object>)
 The Fitter class fits the given data using scipy.odr

Parameters

- x [array_like] Rank-1, Independent variable
- y [array_like] Rank-1, Dependent variable, should be of the same shape as x
- **xerror** [array_like or function] Rank 1, Error in x, should be of the same shape as x or func(x) -> xerror
- yerror [array_like or function] Rank 1, Error in y, should be of the same shape as y or func(y) -> yerror
- **func** [function, optional] fcn(beta, x) -> y, by default *self.omega_z* (Guassian Beam Profile function)

Methods

fit (initial_params)	Fit the data using the odr Model and saves the out-
	put to self.output
load_data(x, y, xerror, yerror)	Load the data into a data object
omega_z(params, z)	Beam Radii Function to be fitted, according
	to https://docs.scipy.org/doc/scipy/reference/odr.
	html
printOutput()	Prints the output of .fit(), otherwise raises a warn-
	ing

fit(initial_params)

Fit the data using the odr Model and saves the output to self.output

Parameters

initial_params [array_like] Represents the initial guesses. Rank 1 Array with length
 equal to the number of parameters defined for self.model.For w(z): Rank 1 of length
 4 with initial_params = array([w_0, z_0, M_sq, lmbda])

Returns

self.output [Output instance] This object is also assigned to the attribute .output of Fitter

load_data(x, y, xerror, yerror)

Load the data into a data object

Parameters

- x [array_like] Rank 1, Independent variable
- y [array_like] Rank 1, Dependent variable, should be of the same shape as x
- **xerror** [array_like or function] Rank 1, Error in x, should be of the same shape as x or func(x) -> xerror
- yerror [array_like or function] Rank 1, Error in y, should be of the same shape as y or func(y) -> yerror

static omega_z(params, z)

Beam Radii Function to be fitted, according to https://docs.scipy.org/doc/scipy/reference/odr.html

Parameters

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z [array_like] rank-1 array of positions along an axis

Returns

 $\label{eq:continuous} \textbf{y} \ [\text{array_like}] \ \text{Rank-1}, \text{calculated beam-radii of a single axis based on given parameters} \\ \text{printOutput()}$

Prints the output of .fit(), otherwise raises a warning

Raises

RuntimeWarning Raised if .fit() has not been run.

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