Nanoscan M-Squared Automation

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CONTENTS:

`fit_functions.omega_z(`*params*, *z*`)`
Beam Radii Function to be fitted, according to https://docs.scipy.org/doc/scipy/reference/odr.html

Parameters

params [array_like] rank-1 array of length 4 where `beta = array([w_0, z_0, M_sq, lmbda])`

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

Returns

y [array_like] Rank-1, calculated beam-radii of a single axis based on given parameters

`class fitter.Fitter(`*x*, *y*, *xerror*, *yerror*, *func=<function omega_z>*`)`
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 output to `self.output`
load_data(x, y, xerror, yerror)	Load the data into a data object
printOutput()	Prints the output of .fit(), otherwise raises a warning

`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

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

Raises

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

CHAPTER

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