

SPHERLSanal

1.0

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Chapter 1

Directory Hierarchy

1.1 Directories

This directory hierarchy is sorted roughly, but not completely, alphabetically:

scripts 7

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

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Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

`/home/cgeroux/WORK/SPHERLS/scripts/cp_files.py` [31](#)

Chapter 4

Directory Documentation

4.1 /home/cgeroux/WORK/SPHERLS/scripts/ Directory Reference

Files

- file `average_PKE.py`
- file `combine_bins.py`
- file `combine_bins_persistent.py`
- file `compare_sedov_blasts.py`
- file [cp_files.py](#)
- file `datafile.py`
- file `diffDumps.py`
- file `disect_filename.py`
- file `dump.py`
- file `eos_interp.py`
- file `foureir_transform.py`
- file `make_2DSlices.py`
- file `make_hdf.py`
- file `make_hdf2.py`
- file `make_profiles.py`
- file `mv_files.py`
- file `mywarnings.py`
- file `parse_formula.py`
- file `paths.py`
- file `period_from_PKE_ave.py`
- file `plot_2DSlices.py`
- file `plot_file.py`
- file `plot_light_curve.py`
- file `plot_Lum_diffs.py`
- file `plot_max_variance.py`
- file `plot_max_variance_ave.py`

- file `plot_max_variance_exploring.py`
- file `plot_profile.py`
- file `plot_reproducible.py`
- file `post_processing.py`
- file `ref_calcs.py`
- file `rm_files.py`
- file `rm_oldest_dir.py`
- file `SPHERLS_run.py`
- file `test_calculation.py`
- file `test_restart.py`
- file `work_plot.py`
- file `xmlParseFunctions.py`

Chapter 5

Class Documentation

5.1 plot_file::Axis Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `plots`
- `xlabel`
- `limits`
- `bMinorTics`
- `grid`

5.1.1 Detailed Description

This class holds all the information needed for a particular x-axis. An axis can either be either of time, or of some column in the data files.

5.1.2 Member Function Documentation

5.1.2.1 def plot_file::Axis::__init__ (*self*, *element*, *options*)

This function initializes the axis object.

5.1.2.2 `def plot_file::Axis::load (self, files, options)`

This function loads the values needed for the x-axis data from the `fileData` argument

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_file.py`

5.2 plot_profile::Axis Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `plots`
- `bTime`
- `period`
- `nColumn`
- `xlabel`
- `x`
- `formulaOrig`
- `formula`
- `phase`
- `code`
- `limits`
- `bMinorTics`
- `grid`

5.2.1 Detailed Description

This class holds all the information needed for a particular x-axis. An axis can either be either of time, or of some column in the data files.

5.2.2 Member Function Documentation

5.2.2.1 def plot_profile::Axis::__init__ (*self*, *element*, *options*)

This function initializes the axis object.

5.2.2.2 def plot_profile::Axis::load (*self*, *fileData*, *options*)

This function loads the values needed for the x-axis data from the fileData argument

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_profile.py`

5.3 plot_profile::Curve Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `nColumn`
- `zone`
- `nCurveIDForZoneRef`
- `y`
- `index`
- `bTime`
- `formulaOrig`
- `code`
- `style`
- `color`
- `markersize`
- `linewidth`
- `testZoneAdjust`
- `label`

5.3.1 Detailed Description

This class holds all the information for a curve on a plot.

5.3.2 Member Function Documentation

5.3.2.1 def plot_profile::Curve::__init__ (*self*, *element*, *type*)

This method initializes a curve object, the `type` parameter allows checking curve syntax against axis syntax to see if they match.

5.3.2.2 def plot_profile::Curve::load (*self*, *fileData*, *options*)

This method adds a `y` value and `index` to the curve for the current `fileData`.

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_profile.py`

5.4 plot_file::Curve Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `nColumnX`
- `nColumnY`
- `nColumnErr`
- `y`
- `x`
- `error`
- `index`
- `formulaOrigY`
- `formulaOrigX`
- `formulaOrigErr`
- `formulaX`
- `formulaY`
- `formulaErr`
- `codeY`
- `codeX`
- `codeErr`
- `style`
- `color`
- `markersize`
- `linewidth`
- `label`
- `fileReference`
- `nRowShiftErr`
- `nRowShiftX`
- `nRowShiftY`
- `marker`
- `ecolor`
- `elinewidth`
- `capsize`

5.4.1 Detailed Description

This class holds all the information for a curve on a plot.

5.4.2 Member Function Documentation

5.4.2.1 `def plot_file::Curve::__init__ (self, element)`

This method initializes a curve object, the type parameter allows checking curve syntax against axis syntax to see if they match.

5.4.2.2 `def plot_file::Curve::load (self, files, options)`

This method adds a y value and index to the curve for the current fileData.

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_file.py`

5.5 datafile::DataFile Class Reference

Public Member Functions

- def `setFileSize`
- def `readFile`
- def `readFileFixed`
- def `readFileUnFixed`

Static Public Attributes

- `sColumnNames` = None
- `fColumnValues` = None
- `sHeader` = None

5.5.1 Detailed Description

A generic class for holding a file consisting of a header and columns of floats

5.5.2 Member Function Documentation

5.5.2.1 def datafile::DataFile::readFile (*self*, *sFileName*)

a wrapper to determine which readFile function should be used

5.5.2.2 def datafile::DataFile::readFileFixed (*self*, *sFileName*)

Reads in a file when the size has already been set using \ref setFileSize, or by a previous file read using \ref readFileUnFixed.

5.5.2.3 def datafile::DataFile::readFileUnFixed (*self*, *sFileName*)

Reads in a file when the size is not fixed and needs to be determined from the input file being read in

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/datafile.py`

5.6 plot_file::DataSet Class Reference

Public Member Functions

- def `__init__`
- def `load`
- def `getCurve`

Public Attributes

- `axes`
- `files`

5.6.1 Detailed Description

This class holds all the information for a single dataSet, which includes the `baseFileName` of the dataset, the range of the dataSet (start-end), the times and phases of the files within the range of the dataSet, and the plots made from the dataSet.

5.6.2 Member Function Documentation

5.6.2.1 def plot_file::DataSet::__init__ (*self*, *element*, *options*)

Initilizes the dataSet by setting `baseFileName`, `start`, `end`, and intilizing plots from an xml element

5.6.2.2 def plot_file::DataSet::load (*self*, *options*)

Loads the dataSet, this means that it sets, time, phases, and plots data

5.6.2.3 def plot_file::DataSet::getCurve (*self*, *ID*)

Returns a curve object that has ID, ID

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_file.py`

5.7 plot_profile::DataSet Class Reference

Public Member Functions

- def `__init__`
- def `load`
- def `getCurve`

Public Attributes

- `baseFileName`
- `start`
- `end`
- `axes`
- `nNumFiles`
- `fileIndices`
- `hasNonTimeAxis`

5.7.1 Detailed Description

This class holds all the information for a single dataSet, which includes the `baseFileName` of the dataset, the range of the dataSet (start-end), the times and phases of the files within the range of the dataSet, and the plots made from the dataSet.

5.7.2 Member Function Documentation

5.7.2.1 def plot_profile::DataSet::__init__ (*self*, *element*, *options*)

Initilizes the dataSet by setting `baseFileName`, `start`, `end`, and intilizing plots from an xml element

5.7.2.2 def plot_profile::DataSet::load (*self*, *options*)

Loads the dataSet, this means that it sets, time, phases, and plots data

5.7.2.3 def plot_profile::DataSet::getCurve (*self*, *ID*)

Returns a curve object that has ID, ID

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_profile.py`

5.8 eos_interp::eosTable Class Reference

Public Member Functions

- def [load](#)
- def [write](#)
- def [plotLogE](#)
- def [plotLogP](#)
- def [interpolate](#)
- def [__init__](#)

Public Attributes

- [status](#)
- [X](#)
- [Z](#)
- [logT](#)
- [logD](#)
- [logP](#)
- [logE](#)
- [sFileName](#)

5.8.1 Detailed Description

Holds equation of state data.

5.8.2 Member Function Documentation

5.8.2.1 def eos_interp::eosTable::load (*self*)

Reads in an OPAL equation of state file.

It puts the resulting file info into:

```
self.X: the hydrogen mass fraction
self.Z: the metal mass fraction
self.logD: numpy array of log density grid points [g/cm^3]
self.logT: numpy array of log tempeature grid points [K]
self.logE: numpy array of log energy [ergs/g]
self.logP: numpy array of log pressure [dynes/cm^2]
```

self.logD, self.logT, self.logE, and self.logP are all the same size numpy arrays, empty emelents have logE and logP as nans.

5.8.2.2 def eos_interp::eosTable::write (*self*, *args*)

Generic write function that calls either writeToScreen, or writeToFiel depending on if a file name is specified or not.

5.8.2.3 def eos_interp::eosTable::plotLogE (*self*, *otherTables* = None, *logDIndexList* = None, *wireFrame* = True)

Plots LogE

Keywords:

otherTables: a list of other eosTables to include in the plot

logDIndexList: a list of integers corresponding to which densities to plot the tables at

wireFrame: if set to true (the default) and *logDIndexList* is set to None it will plot a 3D wireframe of logE.

5.8.2.4 def eos_interp::eosTable::plotLogP (*self*, *otherTables* = None, *logDIndexList* = None, *wireFrame* = True)

Plots LogP

Keywords:

otherTables: a list of other eosTables to include in the plot

logDIndexList: a list of integers corresponding to which densities to plot the tables at

wireFrame: if set to true (the default) and *logDIndexList* is set to None it will plot a 3D wireframe of logP.

5.8.2.5 def eos_interp::eosTable::interpolate (*self*, *gridConfig*, *setExtrapolatedToNan* = True)

Interpolate from self's table to the gridding specified by:

logDMin: first (smallest) logD value of grid

logDDel: spacing in logD

numLogD: number of logD grid points

logTMin: first (smallest) logT value of grid

logTDel: spacing in logT

numLogT: number of logT grid points

5.8.2.6 def eos_interp::eosTable::__init__ (*self*, *sFileName* = None)

Returns a new instance of eosTable.

If *sFileName* is set it will use that to set the filename to load the data from.

The documentation for this class was generated from the following file:

- /home/cgeroux/WORK/SPHERLS/scripts/eos_interp.py

5.9 eos_interp::eosTableManager Class Reference

Public Member Functions

- def [load](#)
- def [interpComp](#)
- def [plotGrid](#)
- def [getTableFromComp](#)
- def [__init__](#)

Public Attributes

- [Z](#)
- [X](#)
- [eosFileName](#)
- [eosTables](#)

5.9.1 Detailed Description

Manages equation of state files, including how they are interpolated between.

5.9.2 Member Function Documentation

5.9.2.1 def eos_interp::eosTableManager::load (*self*)

Loads eos files.

Sets the following:

self.Z: a list of Z (metal mass fraction) values of the equation of state files
 self.X: a list of X (hydrogen mass fraction) values of the equation of state files

5.9.2.2 def eos_interp::eosTableManager::interpComp (*self*, *X*, *Z*)

Interpolates a set of eos files and opacities to the desired X and Z, and returns an eosManager with this new set of files which can then be interpolated to the desired rho and T's.

5.9.2.3 def eos_interp::eosTableManager::plotGrid (*self*, *eosIndex*)

Plot rho and T points that form the grid

5.9.2.4 def eos_interp::eosTableManager::getTableFromComp (*self*, *X*, *Z*)

Returns a shallow copy of the eos table with matching composition. If none found it returns None.

5.9.2.5 def eos_interp::eosTableManager::__init__ (*self*, *eosFileName* = None)

Returns a new instance of eosTableManager.

if eosFileName is set it will call __initFromFile to load settings from a file to initialize the new eosTableManager.

The documentation for this class was generated from the following file:

- /home/cgeroux/WORK/SPHERLS/scripts/eos_interp.py

5.10 eos_interp::interpTable Class Reference

Public Member Functions

- def [interpolate](#)
- def [read](#)
- def [plotLogE](#)
- def [plotLogP](#)
- def [plotLogK](#)
- def [__init__](#)

Public Attributes

- [eosAtNewComp](#)
- [opacityAtNewComp](#)
- [eosTable](#)
- [opacityTable](#)
- [sFileName](#)
- [numLogR](#)
- [X](#)
- [Z](#)
- [gridConfig](#)
- [logD](#)
- [logT](#)
- [logP](#)
- [logE](#)
- [logK](#)
- [outputFile](#)
- [plot](#)

5.10.1 Detailed Description

This class reads in and holds data for an equations of state and opacities from a file formatted in the same was as read to and written by the class defined in eos.h, and implemented in eos.cpp.

5.10.2 Member Function Documentation

5.10.2.1 def eos_interp::interpTable::interpolate (*self*, *eosSet*, *opacitySet*, *withoutNans* = False)

creates the interpolated table and writes it out

5.10.2.2 `def eos_interp::interpTable::read (self, sFilename)`

Reads in an interpolated table

5.10.2.3 `def eos_interp::interpTable::plotLogE (self, otherTables = None, logDIndexList = None, logDRangeList = None, wireFrame = True, rstride = 1, cstride = 1)`

Plots LogE

Keywords:

otherTables: a list of other eosTables to include in the plot
logDIndexList: a list of integers corresponding to which densities to plot the tables at
wireFrame: if set to true (the default) and *logDIndexList* is set to None it will plot a 3D wireframe of logE.

5.10.2.4 `def eos_interp::interpTable::plotLogP (self, otherTables = None, logDIndexList = None, logDRangeList = None, wireFrame = True)`

Plots LogP

Keywords:

otherTables: a list of other eosTables to include in the plot
logDIndexList: a list of integers corresponding to which densities to plot the tables at
wireFrame: if set to true (the default) and *logDIndexList* is set to None it will plot a 3D wireframe of logP.

5.10.2.5 `def eos_interp::interpTable::plotLogK (self, otherTables = None, logDIndexList = None, logDRangeList = None, wireFrame = True)`

Plots opacity

Keywords:

otherTables: a list of opacity tables to also be plotted
logDIndex: a list of integers used to indicate a specific logR index to plot 2D line plots at.

5.10.2.6 `def eos_interp::interpTable::__init__ (self, tableElement = None)`

Reads in an interpolation table info from from the xml element tableElement.

The documentation for this class was generated from the following file:

- /home/cgeroux/WORK/SPHERLS/scripts/eos_interp.py

5.11 eos_interp::opacityTable Class Reference

Public Member Functions

- def [load](#)
- def [plotLogK](#)
- def [interpolate](#)
- def [__init__](#)
- def [fillInDepNans](#)

Public Attributes

- [multitableFile](#)
- [X](#)
- [Z](#)
- [sFileName](#)
- [logT](#)
- [logR](#)
- [logK](#)

5.11.1 Detailed Description

Holds opacity table data.

Initialize with a composition (X,Z), file name and whether the file name contains multiple.

5.11.2 Member Function Documentation

5.11.2.1 def eos_interp::opacityTable::load (*self*)

Load from a file an opacity table for composition of the current opacity object. It does this by advancing a file until the composition is matched and then calls `__loadTableFromFile` to load the `logR`, `logT`, and `logK` values.

5.11.2.2 def eos_interp::opacityTable::plotLogK (*self*, *otherTables* = None, *logRIndex* = None, *wireFrame* = True)

Plots opacity

Keywords:

`otherTables`: a list of opacity tables to also be plotted

`logRIndex`: a list of integers used to indicate a specific `logR` index to plot 2D line plots at.

5.11.2.3 def eos_interp::opacityTable::interpolate (*self*, *gridConfig*, *setExtrapolatedToNan* = True)

Interpolate from self's table to the gridding specified by:

parameters:

logDMin: first (smallest) logD value of grid
 logDDel: spacing in logD
 numLogD: number of logD grid points
 logTMin: first (smallest) logT value of grid
 logTDel: spacing in logT
 numLogT: number of logT grid points

keyword:

setExtrapolatedToNan: controls weather extrapolated points are set to nans (default is True)

returns:

an opacity table interpolated to the specified grid. In addition to the regular members of an opacity table logD is also included.

5.11.2.4 def eos_interp::opacityTable::__init__ (*self*, *X* = None, *Z* = None, *sFileName* = None, *multitableFile* = None)

Initializes the opacity object.

sets:

self.X: the hydrogen mass fraction
 self.Z: the metal mass fraction
 self.sFileName: the file name to load the table from
 self.multitableFile: weather or not the file has more than one table in it

5.11.2.5 def eos_interp::opacityTable::fillInDepNans (*self*)

Fills in logR and logT values to make a rectangular grid

The documentation for this class was generated from the following file:

- /home/cgeroux/WORK/SPHERLS/scripts/eos_interp.py

5.12 eos_interp::opacityTableManager Class Reference

Public Member Functions

- def [load](#)
- def [interpComp](#)
- def [plotGrids](#)
- def [getTableFromComp](#)
- def [__init__](#)

Public Attributes

- [opacityConfigFileName](#)
- [opacityFileNames](#)
- [opacityTables](#)
- [Z](#)
- [X](#)

5.12.1 Detailed Description

Manages opacity files, including how they are interpolated between in composition.

5.12.2 Member Function Documentation

5.12.2.1 def eos_interp::opacityTableManager::load (*self*)

Loads opacity files and merge files at duplicate compositions (i.e. merges low and high temperature opacity tables).

Sets the following:

self.X: list of hydrogen mass fractions covered by opacity tables

self.Z: list of metal mass fractions covered by opacity tables

5.12.2.2 def eos_interp::opacityTableManager::interpComp (*self*, *X*, *Z*)

Interpolates a set of opacity files to the desired X and Z, and returns an the interpolated opacityTable.

Parameters:

X: hydrogen mass fraction

Z: metal mass fraction

5.12.2.3 def eos_interp::opacityTableManager::plotGrids (*self*, *opacityIndex*)

Plot LogR and LogT points that form the opacity grid.

Parameters:

opacityIndex: a list of integers used to select which opacity tables will be plotted

5.12.2.4 def eos_interp::opacityTableManager::getTableFromComp (*self*, *X*, *Z*)

Returns a shallow copy of the opacity table with matching composition.

5.12.2.5 def eos_interp::opacityTableManager::__init__ (*self*, *opacityConfigFile* = None)

Creates a new instance of opacityTableManager.

If opacityConfigFile is set it will try to parse it for xml settings to get all the file names of the opacity files to include in the opacityTableManager.

The documentation for this class was generated from the following file:

- /home/cgeroux/WORK/SPHERLS/scripts/eos_interp.py

5.13 plot_file::Plot Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `ylabel`
- `curves`
- `limits`
- `grid`
- `bMinorTics`
- `legendloc`

5.13.1 Detailed Description

This class holds all the information for a single plot, namely the list of curves for that plot.

5.13.2 Member Function Documentation

5.13.2.1 def plot_file::Plot::__init__ (*self*, *element*)

This method initializes the plot object

5.13.2.2 def plot_file::Plot::load (*self*, *files*, *options*)

loads the data for a plot, y-data is stored in the curves, and sets the ylabel from the first file read in

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_file.py`

5.14 plot_profile::Plot Class Reference

Public Member Functions

- def `__init__`
- def `load`

Public Attributes

- `ylabel`
- `curves`
- `limits`
- `grid`
- `bMinorTics`
- `legendloc`

5.14.1 Detailed Description

This class holds all the information for a single plot, namely the list of curves for that plot.

5.14.2 Member Function Documentation

5.14.2.1 def plot_profile::Plot::__init__ (*self*, *element*, *type*)

This method initializes the plot object

5.14.2.2 def plot_profile::Plot::load (*self*, *fileData*, *options*)

loads the data for a plot, y-data is stored in the curves, and sets the ylabel from the first file read in

The documentation for this class was generated from the following file:

- `/home/cgeroux/WORK/SPHERLS/scripts/plot_profile.py`

Chapter 6

File Documentation

6.1 /home/cgeroux/WORK/SPHERLS/scripts/cp_files.py File Reference

Namespaces

- namespace `cp_files`

Functions

- def `cp_files::main`
Documentation for a function.
- def `cp_files::cp_files`
Documentation for a function.

6.1.1 Detailed Description

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