nice_scheme_plotter Documentation

Release 01

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class database_reader.**Level**(*energy*, *spinValue=None*, *parity=None*, *lifetime=None*)

This is class for excited nuclear levels, which contains all information about level itself and its plotting style.

Parameters

energy [float] Excited level energy.

spinValue [str] Spin value as a string '1/2', '5/2', etc.

parity [str {'+', '-', ''} or None] Level parity.

lifetime [float] Excited level lifetime.

Attributes

energy [float] Excited level energy

spinValue [str] Excited level spin, represented by a string. Example: '1/2', '5/2', etc.

parity [str {'-', '+', ''}] Excited level parity.

level_linewidth: float Level linewidth on the plot, default value is 0.5

color [str {'black', 'red', 'green', etc.} or RGB code] Level line color. Default value is 'black'.

linestyle [str {'solid', 'dashed'}] Level linestyle.

lifetime [float] Level lifetime.

Methods

highlight(linewidth=4, color='red')	Changes instance's linewidth and color attributes.

class database_reader.**Transition**(*gammaEnergy*, *from_lvl*, *to_lvl*, *gammaEnergy_err=None*, *intensity=None*, *instensity_err=None*)

This is class for transitions of the nuclear states with emission of a gamma ray. The class instance contains all information about transition itself and its plotting style.

Parameters

gammaEnergy [float] Excited level energy.

from_lvl [float] Energy of the state in which the nuclei was **before** gamma transition.

to_lvl [float] Energy of the state in which the nuclei was **after** gamma transition.

gammaEnergy_err [float] Excited level energy error value (default value is None).

intensity [float] Intensity of the transition (default value is None).

intensity_err [float] Energy of the level in which the nuclei was before gamma transition (default value is None).

Attributes

gammaEnergy [float]

from_lvl [float]

to_lvl [float]

gammaEnergy_err [float]

intensity [float]

instensity_err [float]

transition_linewidth: float Transition linewidth on the plot, default value is 0.001. Be careful, there is different scale of width in use, in comparison to class Level.

color [str {'black', 'red', 'green', etc.} or RGB code] Level line color. Default value is 'black'.

linestyle [str {'solid', 'dashed'}] Level linestyle.

lifetime [float]

Methods

transitionDescription()	Returns transition description as a string.

transitionDescription()

Returns transition description as a string.

Returns str 'E (dE) I (dI)'

class database_reader.**Database_csv**(*lvlFileName*, *transitionsFileName*)

Create database from csv file.

Parameters

lvlFileName [str] File which contains lvls description.

transitionsFileName [str] File which contains transitions description.

Attributes

levels [pandas.DataFrame] Contains levels information.

transitions [pandas.DataFrame] Contains transitions information.

Methods

levelsPackage()	Creates dictionary of Level_objects
transitionsPackage()	Creates dictionary of Transition_objects

slice	

levelsPackage()

Creates dictionary of Level_objects

Returns dictionary of Level_objects with keys equal to energy {'energy' : Level_object }

transitionsPackage()

Creates dictionary of Transition_objects

Returns dictionary of Transition objects with keys equal to the transition's energy {'energy' : Transition_object }

class database_reader.**Database_xlsx**(*databaseFileName*)

Create database from xlsx file. This classs inherited methods from Database_csv class.

Parameters

databaseFileName [str] File which contains lvls description.

Attributes

levels [pandas.DataFrame] Contains levels information.

transitions [pandas.DataFrame] Contains transitions information.

Methods

`levelsPackage`()	Creates dictionary of Level_objects
`transitionsPackage`()	Creates dictionary of Transition_objects

slice	

`class nice_scheme_plotter.Scheme(**kwargs)`

Creates scheme object with various methods for plotting gamma transitions scheme of the excited nuclei.

…

Attributes

figureWidth [float] Class attribute. Output scheme window/canvas width.

figureLength [float] Class attribute. Output scheme window/canvas length.

dpi [int] Class attribute. Output scheme window/canvas dpi factor.

fontSize [int] Class attribute. Level labels font size.

transition_fontSize [int] Class attribute. Transitions labels font size.

spinAnnotationWidthFactor [float] Class attribute. Part of scheme plot width which will be taken by left sided annotation (spin and parity part).

energyAnnotationWidthFactor [float] Class attribute. Part of scheme plot width which will be taken by right sided annotation (level energy).

spinAnnotationSlopeFactor [float] Class attribute. Part of scheme plot width which will be taken for slope **on the left side**, when annotation and level line splitting is needed (this is needed when bunch of levels is closer to each other than annotation height.

energyAnnotationSlopeFactor [float] Class attribute. Part of scheme plot width which will be taken for slope **on the right side**, when annotation and level line splitting is needed (this is needed when bunch of levels is closer to each other than annotation height.

transtitionsSpacingFactor [float] Class attribute. Part of scheme plot width which will be taken as gap between transition arrows.

Methods

`addLevel`(Level_object)	Plots level on the scheme.
`addLevelsPackage`(levelsPackage)	Plots all levels from the levels package (see more about levelsPackage).
`addNucleiName`([nucleiName])	Adds nuclei name to the decay scheme.
`addTransition`(Transition_object)	Plots transition on the scheme.

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addTransitionsPackage(transitionsPackage)	Plots all transition from the transitions package (see more about transitionsPackage).
enableLatex()	Enables LaTeX rendering for all strings in the scheme plot.
save([fileName])	Saves plot to the file.
show()	Shows resulting scheme.

addLevel (*Level_object*)

Plots level on the scheme.

Param Level_object

addLevelsPackage (*levelsPackage*)

Plots all levels from the levels package (see more about levelsPackage).

Param levelsPackage

addNucleiName (*nucleiName='^{63}Ni'*)

Adds nuclei name to the decay scheme.

Param nucleiName : *str* (best option is to use LaTeX typing method. Example: nucleiName=r'^{63}Ni')

addTransition (*Transition_object*)

Plots transition on the scheme.

Param Transition_object

addTransitionsPackage (*transitionsPackage*)

Plots all transition from the transitions package (see more about transitionsPackage).

Param transitionsPackage

enableLatex ()

Enables LaTeX rendering for all strings in the scheme plot. (!) This function has to be called **before** Scheme_object.addLevel(), Scheme_object.addLevelsPackage() methods (and analogously for add-transitions).

save (*fileName=None*)

Saves plot to the file. :param: fileName: filename. It is recommended to use .svg extension, for example fileName='my_scheme.svg'. It is also allowed to **not pass** any file name (especially if there will be more than one Scheme_object plots saved during code operation. The Scheme class will enumerate all of it's instances, and later save them to different files. Example:

```
>>> s1 = Scheme()
>>> s2 = Scheme()
>>> s3 = Scheme()
>>> ...
>>> s1.save()
>>> s2.save()
>>> s3.save()
```

In the result three files will be created: `scheme_part_1.svg`, `scheme_part_2.svg` and `scheme_part_3.svg`. It is useful when scheme splitting for many pages is needed.

show ()

Shows resulting scheme.

CHAPTER

ONE

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