

# bohr

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simple atom representation according to the Bohr model

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English documentation

This package provides means for the creation of simple Bohr models of atoms up to the atomic number 112. Additionally commands are provided to convert atomic numbers to element symbols or element names and vice versa.

The package is inspired by a question on <http://tex.stackexchange.com/>: Draw Bohr atomic model with electron shells in TeX?

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## 1 Licence and Requirements

**BOHR** is placed under the terms of the LaTeX Project Public License, version 1.3 or later (<http://www.latex-project.org/lppl.txt>). It has the status “maintained.”

**BOHR** loads and needs the packages `tikz`,<sup>1</sup> `pgfopts`<sup>2</sup> and `etoolbox`.<sup>3</sup>

## 2 Options

Every option described in the manual can also be used as package option. Options are indicated as `option` and are all key/value like options. Some options can be set without value, too. Then

<sup>1</sup> CTAN: `tikz`   <sup>2</sup> CTAN: `pgfopts`   <sup>3</sup> CTAN: `etoolbox`

the underlined value is used.

### 3 Usage

**BOHR** is used like any other  $\text{\LaTeX}$  2 $\epsilon$  package:

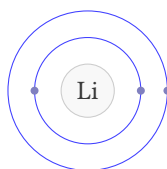
```
1 \usepackage{bohr}
```

The main command, `\bohr`, creates the models:

► `\bohr[<num of shells>]{<number of electrons>}{<atom name>}`

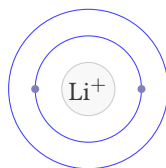
This is described best by an example:

```
1 \bohr{3}{Li}
```



There is not much more to it. Another example using the optional argument:

```
1 \bohr[2]{2}{\mathrm{Li}^+}
```



### 4 Customization

**BOHR** provides a handful of options to customize the appearance:

► `\setbohr{<options>}`

Options are set in a key/value syntax using this command.

► `insert-symbol = true|false`

Default: false

If set to true **BOHR** will insert the atomic symbol suiting to the given electron number if *no* third argument is given.

► `insert-number = true|false`

Default: false

If set to true **BOHR** will use the appropriate number of electrons for the given element symbol in the third argument if *no* second argument is given. This of course only works if the third argument is one of the 112 element symbols.

- ▶ `insert-missing` = `true|false` Default: false  
Sets both `insert-symbol` and `insert-number`.
- ▶ `atom-style` = `<code>` (initially empty)  
This code will be placed immediatly before the third argument of `\bohr`. The last macro in it may need one argument.
- ▶ `name-options-set` = `<tikz>` (initially empty)  
This value is passed to the options of the `\node` the third argument of `\bohr` is placed in.
- ▶ `name-options-add` = `<tikz>` (initially empty)  
This value will be added to options set with `name-options-set`.
- ▶ `nucleus-option-set` = `<tikz>` Default: draw=black!80,fill=black!10,opacity=.25  
This value is passed to the options of the `\draw` command that draws the circle around the name-node.
- ▶ `nucleus-options-add` = `<tikz>` (initially empty)  
This value will be added to options set with `nucleus-options-set`.
- ▶ `nucleus-radius` = `<dim>` Default: 1em  
The radius of the circle around the name-node.
- ▶ `electron-options-set` = `<tikz>` Default: blue!50!black!50  
This value is passed to the options of the `\fill` command that draws the electrons.
- ▶ `electron-options-add` = `<tikz>` (initially empty)  
This value will be added to options set with `electron-options-set`.
- ▶ `electron-radius` = `<dim>` Default: 1.5pt  
The radius of the circles that represent the electrons.
- ▶ `shell-options-set` = `<tikz>` Default: draw=blue!75,thin  
This value is passed to the options of the `\draw` command that draws the circles that represent the shells.
- ▶ `shell-options-add` = `<tikz>` (initially empty)  
This value will be added to options set with `shell-options-set`.
- ▶ `shell-dist` = `<dim>` Default: 1em  
The distance between the nucleus and the first shell and between subsequent shells.
- ▶ `german` = `true|false` Default: false  
If set to true the German names are defined (see section 5 to understand what I mean). They are also defined if you use babel<sup>4</sup> and select language german or ngerman in the preamble. The same holds for polyglossia.<sup>5</sup>

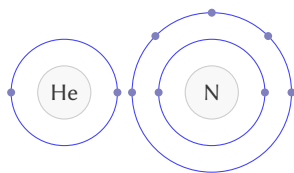
---

<sup>4</sup> CTAN: babel    <sup>5</sup> CTAN: polyglossia

```

1 \setbohr{name-options-set={font=\footnotesize\sffamily}}
2 \bohr{2}{He} \bohr{7}{N}

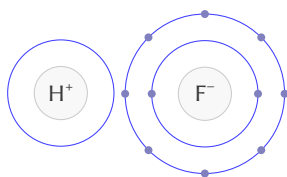
```



```

1 % uses package 'chemmacros'
2 \setbohr{atom-style={\footnotesize\sffamily\ch}}
3 \bohr{0}{H+} \bohr{10}{F-}

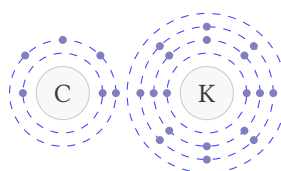
```



```

1 \setbohr{
2   shell-options-add = dashed,
3   shell-dist       = .5em,
4   insert-missing
5 }
6 \bohr{6}{} \bohr{}{K}

```



## 5 Additional Commands

**BOHR** provides some additional commands that return the element symbol or the element name to a given atomic number and vice versa.

- `\elementsymbol{<atomic number>|<element name>}`  
Returns the element symbol for a given atomic number or element name. `\elementsymbol{80}`: Hg; `\elementsymbol{rhenium}`: Rh.
- `\elementname{<atomic number>|<element symbol>}`  
Returns the element name for a given atomic number or element symbol. `\elementname{80}`: Mercury; `\elementname{Rh}`: Rhenium.
- `\atomicnumber{<element name>|<element symbol>}`  
Returns the atomic number for a given element name or element symbol. `\atomicnumber{Hg}`: 80; `\atomicnumber{rhenium}` 75.
- `\Z`  
If this command isn't defined by some other package it is available as an alias of `\atomicnumber`.

1 The elements `\elementname{F}`, `\elementname{Cl}`, `\elementname{Br}`,  
 2 `\elementname{I}` and `\elementname{At}` are called `\emph{halogens}`.

The elements Fluorine, Chlorine, Bromine, Iodine and Astatine are called *halogens*.

## 6 Implementation

```

1 % -----
2 % the BOHR package
3 %
4 %   simple atom representation according to the Bohr model
5 %
6 % -----
7 % Clemens Niederberger
8 % Web:   https://bitbucket.org/cgnieder/bohr/
9 % E-Mail: contact@mychemistry.eu
10 % -----
11 % Copyright 2012 Clemens Niederberger
12 %
13 % This work may be distributed and/or modified under the
14 % conditions of the LaTeX Project Public License, either version 1.3
15 % of this license or (at your option) any later version.
16 % The latest version of this license is in
17 %   http://www.latex-project.org/lppl.txt
18 % and version 1.3 or later is part of all distributions of LaTeX
19 % version 2005/12/01 or later.
20 %
21 % This work has the LPPL maintenance status ‘maintained’.
22 %
23 % The Current Maintainer of this work is Clemens Niederberger.
24 % -----
25 % The bohr package consists of the files
26 % - bohr.sty
27 % - bohr_en.tex, bohr_en.pdf
28 % - bohr_elements_english.def, bohr_elements_german.def
29 % - README
30 % -----
31 % If you have any ideas, questions, suggestions or bugs to report, please
32 % feel free to contact me.
33 % -----
34 \def\@bohr@date{2012/09/22}
35 \def\@bohr@version{v0.2}
36 \def\@bohr@description{simple atom representation according to the Bohr model}
37
38 \ProvidesPackage{bohr}[\@bohr@date\space \@bohr@version\space \@bohr@description]
39 \RequirePackage{tikz,etoolbox,pgfplots}
40
```

```

41 % -----
42 % message handling
43 \def\@bohr@create@message#1{%
44   \ifstrequal{#1}{Error}
45     {%
46       \lowercase{\csdef{@bohr@#1}}##1##2{%
47         \csuse{Package#1}{bohr}{##1}{##2}}%
48     }{%
49       \lowercase{\csdef{@bohr@#1}}##1{%
50         \csuse{Package#1}{bohr}{##1}}%
51     }}
52 \@bohr@create@message{Error}
53 \@bohr@create@message{Warning}
54 \@bohr@create@message{WarningNoLine}
55 \@bohr@create@message{Info}
56
57 % -----
58 % the \bohr command
59 %   optional #1: number of shells
60 %   #2: number of electrons
61 %   #3: atom name
62 \newrobustcmd*{\bohr[3][][\@bohr{#1}{#2}{#3}]}
63
64 \def\@bohr#1#2#3{%
65   \ifblank{#2}% electron number given ?
66     {% no
67       \ifboolexpr{ bool {bohr@insert@number} and test {\ifblank{#3}} }
68         {%
69           \@bohr@error{I can't insert the electron number.}
70           {I can't insert the electron number. You haven't specified the
71             element.}%
72         }{%
73           \ifboolexpr
74             {
75               bool {bohr@insert@number} and not
76               test {\lowercase{\ifcsvoid{@bohr@atom@number@#3}}}
77             }
78             {%
79               \lowercase{%
80                 \def\@bohr@electron@current@number{\csuse{@bohr@atom@number@#3}}}%
81             }{%
82               \@bohr@error{You must specify an electron number, possibly 0.}
83               {You must specify an electron number, possibly 0.}%
84             }%
85           }%
86         }{% yes
87           \ifnum#2<0\relax
88             \@bohr@error{The electron number cannot be negative!}
89             {The electron number cannot be negative!}%

```

```

90     \else
91         \def\@bohr@electron@current@number{#2}%
92     \fi
93 }%
94 \ifblank{#1}
95 { \@bohr@get@shell@num{\@bohr@electron@current@number}}
96 {
97     \@bohr@get@shell@num{\@bohr@electron@current@number}%
98     \ifnum#1<\@bohr@shell@num
99         \@bohr@warning{The shell number you provided (#1) is too small for the
100             electron number you provided (\@bohr@electron@current@number)! I'll
101             use \@bohr@shell@num\space shells.}%
102     \else
103         \ifnum#1>7\relax
104             \@bohr@warning{I know only of 7 electron shells. You gave me #1 so I'll
105                 be using 7 instead.}
106             \def\@bohr@shell@num{7}%
107         \else
108             \def\@bohr@shell@num{#1}%
109         \fi
110     \fi
111 }%
112 \tikzpicture[baseline=(nucleus.base)]
113 \expandafter\draw\expandafter[\@bohr@name@options]
114 (nucleus) at (0,0) {\@bohr@insert@symbol{\@bohr@electron@current@number}{#3}}
115 ;
116 \expandafter\draw\expandafter[\@bohr@nucleus@options]
117 (nucleus) circle (\@bohr@nucleus@radius) ;
118 \foreach\@bohr@current@shell@num in {1,...,\@bohr@shell@num}
119 {
120     \expandafter\draw\expandafter[\@bohr@shell@options]
121     (nucleus) circle (\@bohr@nucleus@radius+\@bohr@current@shell@num*\@bohr@shell@dist) ;
122 }
123 \@bohr@draw@electrons{\@bohr@electron@current@number}
124 \endtikzpicture
125 }
126 \def\@bohr@get@shell@num#1{%
127     \ifnum#1<3\relax
128         \def\@bohr@shell@num{1}%
129     \else
130         \ifnum#1<11\relax
131             \def\@bohr@shell@num{2}%
132         \else
133             \ifnum#1<19\relax
134                 \def\@bohr@shell@num{3}%
135             \else
136                 \ifnum#1<37\relax

```

```

137         \def\@bohr@shell@num{4}%
138     \else
139         \ifnum#1<55\relax
140             \def\@bohr@shell@num{5}%
141         \else
142             \ifnum#1<87\relax
143                 \def\@bohr@shell@num{6}%
144             \else
145                 \ifnum#1<110\relax
146                     \def\@bohr@shell@num{7}%
147                 \else
148                     \def\@bohr@shell@num{112}%
149                     \@bohr@warning{I only know atoms up to 112 (Copernicium). You
150                         gave me #1 so I am using 112 instead.}
151                 \fi
152             \fi
153         \fi
154     \fi
155 \fi
156 \fi
157 \fi
158 }
159
160 \def\@bohr@distributed@electrons#1#2#3#4{%
161     \pgfmathparse{#2}%
162     \let\@bohr@last@electron\pgfmathresult
163     \foreach\@bohr@electron@number in {#1,...,\@bohr@last@electron}
164     {
165         \expandafter\fill\expandafter[\@bohr@electron@options] (nucleus)
166             ++(#3*\@bohr@electron@number-#3:\@bohr@nucleus@radius+#4*\@bohr@shell@dist)
167             circle (\@bohr@electron@radius) ;
168     }
169 }
170
171 \def\@bohr@draw@electrons#1{%
172     \ifnum#1<1\relax\else
173         \ifnum#1<3\relax
174             \@bohr@distributed@electrons{1}{#1}{180}{1}%
175         \else
176             \ifnum#1<11\relax
177                 \@bohr@distributed@electrons{1}{2}{180}{1}%
178                 \@bohr@distributed@electrons{1}{#1-2}{45}{2}%
179             \else
180                 \ifnum#1<19\relax
181                     \@bohr@distributed@electrons{1}{2}{180}{1}%
182                     \@bohr@distributed@electrons{1}{8}{45}{2}%
183                     \@bohr@distributed@electrons{1}{#1-10}{45}{3}%
184                 \else
185                     \ifnum#1<37\relax

```



```

186      \@bohr@distributed@electrons{1}{2}{180}{1}%
187      \@bohr@distributed@electrons{1}{8}{45}{2}%
188      \@bohr@distributed@electrons{1}{8}{45}{3}%
189      \@bohr@distributed@electrons{1}{#1-18}{20}{4}%
190  \else
191      \ifnum#1<55\relax
192          \@bohr@distributed@electrons{1}{2}{180}{1}%
193          \@bohr@distributed@electrons{1}{8}{45}{2}%
194          \@bohr@distributed@electrons{1}{8}{45}{3}%
195          \@bohr@distributed@electrons{1}{18}{20}{4}%
196          \@bohr@distributed@electrons{1}{#1-36}{20}{5}%
197      \else
198          \ifnum#1<87\relax
199              \@bohr@distributed@electrons{1}{2}{180}{1}%
200              \@bohr@distributed@electrons{1}{8}{45}{2}%
201              \@bohr@distributed@electrons{1}{8}{45}{3}%
202              \@bohr@distributed@electrons{1}{18}{20}{4}%
203              \@bohr@distributed@electrons{1}{18}{20}{5}%
204              \@bohr@distributed@electrons{1}{#1-54}{11.25}{6}%
205          \else
206              \ifnum#1<113\relax
207                  \@bohr@distributed@electrons{1}{2}{180}{1}%
208                  \@bohr@distributed@electrons{1}{8}{45}{2}%
209                  \@bohr@distributed@electrons{1}{8}{45}{3}%
210                  \@bohr@distributed@electrons{1}{18}{20}{4}%
211                  \@bohr@distributed@electrons{1}{18}{20}{5}%
212                  \@bohr@distributed@electrons{1}{32}{11.25}{6}%
213                  \@bohr@distributed@electrons{1}{#1-86}{11.25}{7}%
214              \fi
215          \fi
216      \fi
217  \fi
218  \fi
219  \fi
220  \fi
221  \fi
222  }
223
224  % -----
225  % atomic numbers and element symbols and names
226  \def\@bohr@define@atom@symbol#1#2{%
227      \csdef{@bohr@atom@symbol@num@\romannumeral#1}{#2}%
228      \lowercase{\csdef{@bohr@atom@number@#2}}{#1}}
229  \def\@bohr@define@atom@name#1#2{%
230      \csdef{@bohr@atom@name@\romannumeral#1}{#2}%
231      \lowercase{\csdef{@bohr@atom@name@num@#2}}{#1}}
232
233  \newrobustcmd*\DeclareAtomName[2]{%
234      \@bohr@define@atom@name{#1}{#2}}

```

```

235 \newrobustcmd*\DeclareAtomSymbol[2]{%
236   \@bohr@define@atom@symbol{#1}{#2}}
237
238 \def\@bohr@get@atom@symbol#1{%
239   \csuse{@bohr@atom@symbol@num@\romannumeral#1}}
240 \def\@bohr@get@atom@number#1{%
241   \lowercase{\csuse{@bohr@atom@number@#1}}}
242 \def\@bohr@get@atom@name#1{%
243   \csuse{@bohr@atom@name@\romannumeral#1}}
244
245 \def\@bohr@element@symbol#1{%
246   \lowercase{\ifcsdef{@bohr@atom@name@num@#1}}
247     {\lowercase{\@bohr@get@atom@symbol{\csuse{@bohr@atom@name@num@#1}}}}
248     {\@bohr@get@atom@symbol{#1}}}
249
250 \def\@bohr@atomic@number#1{%
251   \lowercase{\ifcsdef{@bohr@atom@number@#1}}
252     {\@bohr@get@atom@number{#1}}
253     {\lowercase{\csuse{@bohr@atom@name@num@#1}}}}
254
255 \def\@bohr@elemt@symbol#1{%
256   \if!\ifnum9<#1!\@bohr@get@atom@name{#1}\fi
257   \else
258     \lowercase{\@bohr@get@atom@name{\csuse{@bohr@atom@number@#1}}}%
259   \fi}
260
261 \newrobustcmd*\element@symbol[1]{\@bohr@element@symbol{#1}}
262 \newrobustcmd*\atomic@number[1]{\@bohr@atomic@number{#1}}
263 \newrobustcmd*\element@name[1]{\@bohr@elemt@symbol{#1}}
264 \ifdef\Z{\let\Z\atomic@number}
265
266 \DeclareAtomSymbol{1}{H}
267 \DeclareAtomSymbol{2}{He}
268 \DeclareAtomSymbol{3}{Li}
269 \DeclareAtomSymbol{4}{Be}
270 \DeclareAtomSymbol{5}{B}
271 \DeclareAtomSymbol{6}{C}
272 \DeclareAtomSymbol{7}{N}
273 \DeclareAtomSymbol{8}{O}
274 \DeclareAtomSymbol{9}{F}
275 \DeclareAtomSymbol{10}{Ne}
276 \DeclareAtomSymbol{11}{Na}
277 \DeclareAtomSymbol{12}{Mg}
278 \DeclareAtomSymbol{13}{Al}
279 \DeclareAtomSymbol{14}{Si}
280 \DeclareAtomSymbol{15}{P}
281 \DeclareAtomSymbol{16}{S}
282 \DeclareAtomSymbol{17}{Cl}
283 \DeclareAtomSymbol{18}{Ar}

```

```

284 \DeclareAtomSymbol{19}{K}
285 \DeclareAtomSymbol{20}{Ca}
286 \DeclareAtomSymbol{21}{Sc}
287 \DeclareAtomSymbol{22}{Ti}
288 \DeclareAtomSymbol{23}{V}
289 \DeclareAtomSymbol{24}{Cr}
290 \DeclareAtomSymbol{25}{Mn}
291 \DeclareAtomSymbol{26}{Fe}
292 \DeclareAtomSymbol{27}{Co}
293 \DeclareAtomSymbol{28}{Ni}
294 \DeclareAtomSymbol{29}{Cu}
295 \DeclareAtomSymbol{30}{Zn}
296 \DeclareAtomSymbol{31}{Ga}
297 \DeclareAtomSymbol{32}{Ge}
298 \DeclareAtomSymbol{33}{As}
299 \DeclareAtomSymbol{34}{Se}
300 \DeclareAtomSymbol{35}{Br}
301 \DeclareAtomSymbol{36}{Kr}
302 \DeclareAtomSymbol{37}{Rb}
303 \DeclareAtomSymbol{38}{Sr}
304 \DeclareAtomSymbol{39}{Y}
305 \DeclareAtomSymbol{40}{Zr}
306 \DeclareAtomSymbol{41}{Nb}
307 \DeclareAtomSymbol{42}{Mo}
308 \DeclareAtomSymbol{43}{Tc}
309 \DeclareAtomSymbol{44}{Ru}
310 \DeclareAtomSymbol{45}{Rh}
311 \DeclareAtomSymbol{46}{Pd}
312 \DeclareAtomSymbol{47}{Ag}
313 \DeclareAtomSymbol{48}{Cd}
314 \DeclareAtomSymbol{49}{In}
315 \DeclareAtomSymbol{50}{Sn}
316 \DeclareAtomSymbol{51}{Sb}
317 \DeclareAtomSymbol{52}{Te}
318 \DeclareAtomSymbol{53}{I}
319 \DeclareAtomSymbol{54}{Xe}
320 \DeclareAtomSymbol{55}{Cs}
321 \DeclareAtomSymbol{56}{Ba}
322 \DeclareAtomSymbol{57}{La}
323 \DeclareAtomSymbol{58}{Ce}
324 \DeclareAtomSymbol{59}{Pr}
325 \DeclareAtomSymbol{60}{Nd}
326 \DeclareAtomSymbol{61}{Pm}
327 \DeclareAtomSymbol{62}{Sm}
328 \DeclareAtomSymbol{63}{Eu}
329 \DeclareAtomSymbol{64}{Gd}
330 \DeclareAtomSymbol{65}{Tb}
331 \DeclareAtomSymbol{66}{Dy}
332 \DeclareAtomSymbol{67}{Ho}

```

```

333 \DeclareAtomSymbol{68}{Er}
334 \DeclareAtomSymbol{69}{Tm}
335 \DeclareAtomSymbol{70}{Yb}
336 \DeclareAtomSymbol{71}{Lu}
337 \DeclareAtomSymbol{72}{Hf}
338 \DeclareAtomSymbol{73}{Ta}
339 \DeclareAtomSymbol{74}{W}
340 \DeclareAtomSymbol{75}{Rh}
341 \DeclareAtomSymbol{76}{Os}
342 \DeclareAtomSymbol{77}{Ir}
343 \DeclareAtomSymbol{78}{Pt}
344 \DeclareAtomSymbol{79}{Au}
345 \DeclareAtomSymbol{80}{Hg}
346 \DeclareAtomSymbol{81}{Tl}
347 \DeclareAtomSymbol{82}{Pb}
348 \DeclareAtomSymbol{83}{Bi}
349 \DeclareAtomSymbol{84}{Po}
350 \DeclareAtomSymbol{85}{At}
351 \DeclareAtomSymbol{86}{Rn}
352 \DeclareAtomSymbol{87}{Fr}
353 \DeclareAtomSymbol{88}{Ra}
354 \DeclareAtomSymbol{89}{Ac}
355 \DeclareAtomSymbol{90}{Th}
356 \DeclareAtomSymbol{91}{Pa}
357 \DeclareAtomSymbol{92}{U}
358 \DeclareAtomSymbol{93}{Np}
359 \DeclareAtomSymbol{94}{Pu}
360 \DeclareAtomSymbol{95}{Am}
361 \DeclareAtomSymbol{96}{Cm}
362 \DeclareAtomSymbol{97}{Bk}
363 \DeclareAtomSymbol{98}{Cf}
364 \DeclareAtomSymbol{99}{Es}
365 \DeclareAtomSymbol{100}{Fm}
366 \DeclareAtomSymbol{101}{Md}
367 \DeclareAtomSymbol{102}{No}
368 \DeclareAtomSymbol{103}{Lr}
369 \DeclareAtomSymbol{104}{Rf}
370 \DeclareAtomSymbol{105}{Db}
371 \DeclareAtomSymbol{106}{Sg}
372 \DeclareAtomSymbol{107}{Bh}
373 \DeclareAtomSymbol{108}{Hs}
374 \DeclareAtomSymbol{109}{Mt}
375 \DeclareAtomSymbol{110}{Ds}
376 \DeclareAtomSymbol{111}{Rg}
377 \DeclareAtomSymbol{112}{Cn}
378
379 % element names are defined in bohr_elements_english.def or
380 % bohr_elements_german.def, respectively. Now we need to decide
381 % which ones we want

```

```

382 \AfterEndPreamble{
383 \ifdef\bbl@afterfi{}\long\def\bbl@afterfi#1{\fi#1}}
384 \ifboolexpr
385 {
386   test {\iflanguage{german}} or
387   test {\iflanguage{ngerman}}
388 }
389 {\booltrue{bohr@german}}{}
390 \ifbool{bohr@german}
391 {\input{bohr_elements_german.def}}
392 {\input{bohr_elements_english.def}}
393 }
394
395
396 % -----
397 % options
398 \def\@bohr@name@options{}
399 \def\@bohr@write@atom#1{#1}
400 \def\@bohr@nucleus@radius{1em}
401 \def\@bohr@electron@options{blue!50!black!50}
402 \def\@bohr@electron@radius{1.5pt}
403 \def\@bohr@shell@dist{1em}
404 \def\@bohr@nucleus@options{draw=black!80,fill=black!10,opacity=.25}
405 \def\@bohr@shell@options{draw=blue!75,thin}
406
407 \newbool{bohr@insert@symbol}
408 \newbool{bohr@insert@number}
409 \newbool{bohr@german}
410
411 \def\@bohr@insert@symbol#1#2{%
412   \ifbool{bohr@insert@symbol}
413     {\ifblank{#2}{\@bohr@get@atom@symbol{#1}}{\@bohr@write@atom{#2}}}
414     {\@bohr@write@atom{#2}}}
415
416 \pgfkeys{
417   bohr/.cd,
418   insert-symbol/.is if      = bohr@insert@symbol ,
419   insert-number/.is if      = bohr@insert@number ,
420   insert-missing/.is choice,
421   insert-missing/true/.code =
422     \booltrue{bohr@insert@symbol}\booltrue{bohr@insert@number} ,
423   insert-missing/false/.code =
424     \boolfalse{bohr@insert@symbol}\boolfalse{bohr@insert@number} ,
425   insert-missing/.default   = true ,
426   atom-style/.code          = \def\@bohr@write@atom{#1} ,
427   name-options-set/.code    = \def\@bohr@name@options{#1} ,
428   name-options-add/.code    =
429     \expandafter\def\expandafter\@bohr@name@options\expandafter{\@bohr@name@options,#1} ,

```

```

430     nucleus-radius/.code      = \def\@bohr@nucleus@radius{#1} ,
431     nucleus-options-set/.code = \def\@bohr@nucleus@options{#1} ,
432     nucleus-options-add/.code =
433         \expandafter\def\expandafter\@bohr@nucleus@options\expandafter{\
@bohr@nucleus@options,#1} ,
434     electron-radius/.code     = \def\@bohr@electron@radius{#1} ,
435     electron-options-set/.code = \def\@bohr@electron@options{#1} ,
436     electron-options-add/.code =
437         \expandafter\def\expandafter\@bohr@electron@options\expandafter{\
@bohr@electron@options,#1} ,
438     shell-dist/.code          = \def\@bohr@shell@dist{#1} ,
439     shell-options-set/.code   = \def\@bohr@shell@options{#1} ,
440     shell-options-add/.code   =
441         \expandafter\def\expandafter\@bohr@shell@options\expandafter{\
@bohr@shell@options,#1} ,
442     german/.is if             = bohr@german ,
443     ngerman/.is if            = bohr@german
444 }
445
446 \newrobustcmd\setbohr[1]{\pgfqkeys{/bohr}{#1}}
447
448 \ProcessPgfOptions*
449 \endinput
450
451 % HISTORY
452 2012/09/21 v0.1a - first version on bitbucket
453 2012/09/22 v0.2  - added compatibility up to atomic number 112
454                   - added the commands \elementname and \elementsymbol with
455                   language support German and English
456                   - improved error checking

```

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