

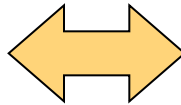
More Rapture Objects

George Howlett
Purdue University

Choices

Tool Interface:

Tool:
⊕ Input:
Choice: value1
⊕ Output:



Model:

- Drift-Diffusion
- Boltzmann Transport Equation
- Quantum Mechanical NEGF

Add Delete

- Drift-Diffusion**
- Boltzmann Transport Equation
- Quantum Mechanical NEGF

Options:

Edit selected entry:

Label:

Value: (optional)

Description:

Add items to the list of choices

Edit the label / value / description for the selected choice

Prompt for elements from the periodic table

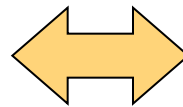
Tool Interface:

Tool:

+ Input:

Periodicelement: value1

+ Output:



Element: Fluorine - F



Default Value: Hydrogen - H

Return value: name, number

Allowed Elements:

- Element Name
- Atomic Symbol
- Atomic Number
- Atomic Weight

Controls what gets set as the <current> value for the selected element in your program

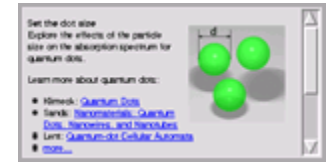
Allowed Elements: Only these:

alkali-metal, halogen

- Actinoid
- Alkali metal
- Alkaline earth metal
- Halogen
- Lanthanoid
- Metalloid
- Nonmetal

Enable or disable various sections of the periodic table

Use Note objects to embed documentation



Tool Interface:

Tool:

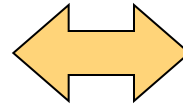
⊕ Input:

- Note: note
- Number: diameter
- Integer: num

⊕ Output:

Object: input.note(note) Rename Help Delete

HTML File: file://docs/bysize.html **Choose...**



Set the dot size

Explore the effects of the particle size on the absorption spectrum for quantum dots.

Learn more about quantum dots:

- Klimeck: [Quantum Dots](#)
- Sands: [Nanomaterials: Quantum Dots, Nanowires, and Nanotubes](#)
- Lent: [Quantum-dot Cellular Automata](#)
- [more...](#)

Particle diameter d:

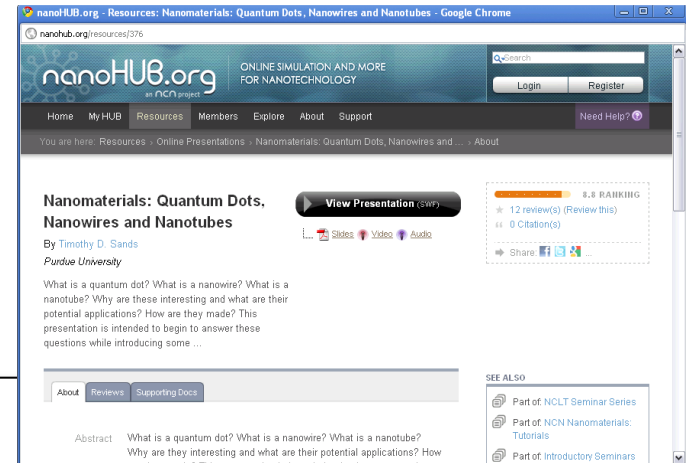
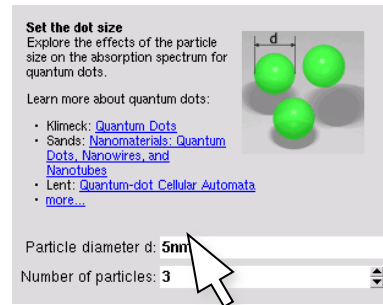
Number of particles:

Set an ordinary HTML file

```
Color xterm
$ ls
docs/  note.tcl  tool.xml
$ ls docs
bysize.gif  bysize.html
$ █
```

Can reference images and other HTML files in the same directory, or using absolute http:// paths

Note can pop up external web sites

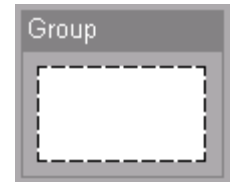


Example: `bysize.html`

```
<html>
<body>
<p>

<b>Set the dot size</b><br/>
Explore the effects of the particle size on
the absorption spectrum for quantum dots.
</p><p>
Learn more about quantum dots:
<ul style="margin: 0px; padding-left: 16px;">
<li>Klimeck: <a href="http://www.nanohub.org/resources/189">Quantum Dots</a></li>
<li>Sands: <a href="http://www.nanohub.org/resources/376">Nanomaterials: Quantum Dots, Nanowires, and Nanotubes</a></li>
<li>Lent: <a href="http://www.nanohub.org/resources/148">Quantum-dot Cellular Automata</a></li>
<li><a href="http://www.nanohub.org/resources/tags/quantumdots">more...</a></li>
</ul>
</p>
</body>
</html>
```

Use Group objects to group inputs together



Tool Interface:

Tool:

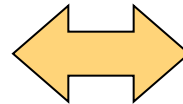
+ Input:

+ Group: tau

Number: tau_n

Number: tau_p

+ Output:



Minority carrier lifetimes

For electrons: **1e-6**

For holes: **1e-6**

Object: input.group(tau) Rename Help Delete

Label: Minority carrier lifetimes

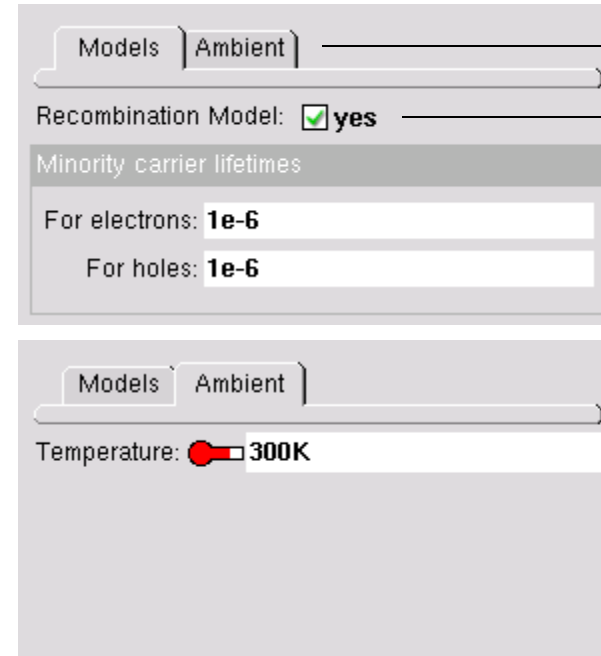
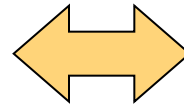
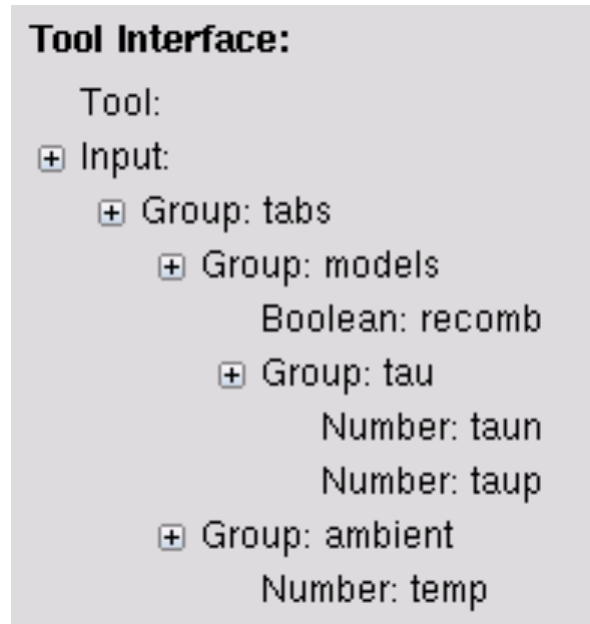
Description: Average time that it takes for a minority carrier to recombine, releasing energy in the form of phonons or photons.

Add label/description to groups

Minority carrier lifetimes

Average time that it takes for a minority carrier to recombine, releasing energy in the form of phonons or photons.

Group of Groups



Group of just groups \Rightarrow tabs

Group with other elements \Rightarrow box with group contents

Use Phase objects to create input panels



Tool Interface:

Tool:

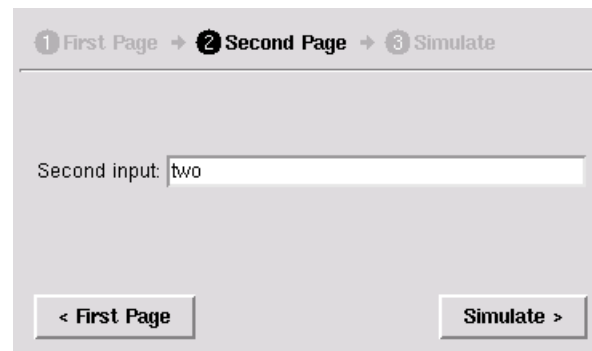
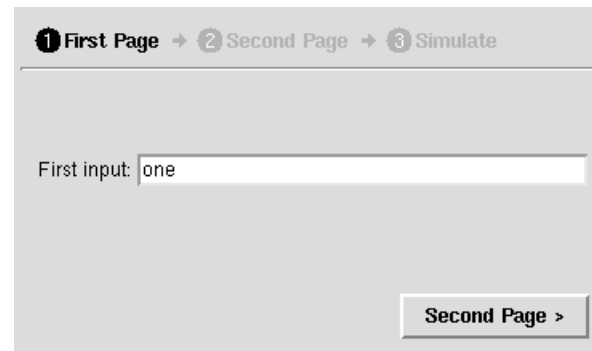
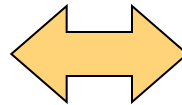
+ Input:

+ Phase: one

String: first

+ Phase: two

String: second



* Use this sparingly--only if there are already lots of inputs and groups.

Enable/disable

Use Enable condition to enable/disable inputs

Drift-Diffusion Options

Recombination Model: no

Minority Carrier Lifetime for electrons:

Minority Carrier Lifetime for holes:

Drift-Diffusion Options

Recombination Model: yes

Minority Carrier Lifetime for electrons:

Minority Carrier Lifetime for holes:

boolean enables/disables number entries

Tool Interface:

Tool:

⊕ Input:

- Choice: model
- ⊕ Group: dd
 - Boolean: recomb**
 - Number: taun
 - Number: taup
- ⊕ Group: bte
 - Number: temp
 - Integer: secret
- ⊕ Group: negf
 - Number: tbe
 - Number: tbn

Object: **input.group(dd).boolean(recomb)** Copy

Label: Recombination Model

Tool Interface:

Tool:

⊕ Input:

- Choice: model
- ⊕ Group: dd
 - Boolean: recomb
 - Number: taun**
 - Number: taup
- ⊕ Group: bte
 - Number: temp
 - Integer: secret
- ⊕ Group: negf
 - Number: tbe
 - Number: tbn

Object: input.group(dd).number(taun) Rename

Label: Minority Carrier Lifetime for electrons

Description:

Enable: input.group(dd).boolean(recomb)

Default Value: 1e-6

2

Paste (ctrl-Y) into the Enable condition of each number

1 Copy the path for the boolean

Enable condition can be an expression

Quantum Mechanical Options

Tight-binding Energy: **2.99eV**

High-energy lifetime: **10ns**

Quantum Mechanical Options

Tight-binding Energy: **3.01eV**

High-energy lifetime: **10ns**

number value enables/disables number below it

Tool Interface:

- Choice: model
- ⊕ Group: dd
 - Boolean: recomb
 - Number: taun
 - Number: taup
- ⊕ Group: bte
 - Number: temp
 - Integer: secret
- ⊕ Group: negf
 - Number: tbe
 - Number: tau**
- ⊕ Output:

Object: input.group(negf).number(tau) Rename

Label: High-energy lifetime

Description: This is used only when the tight-

Enable: input.(negf).(tbe):eV >= 3

Default Value: 10ns

Get the value of the tight-binding energy number

Convert to eV

`input.(negf).(tbe):eV >= 3`

Enable High-energy lifetime whenever tbe >= 3

Enable/disable groups

Use Enable condition to enable/disable whole groups

Model:

Drift-Diffusion Options

Recombination Model: no

Minority Carrier Lifetime for electrons:

Minority Carrier Lifetime for holes:

Group

Enable:

Model:

Boltzmann Transport Equation Options

Temperature:

Group

Enable:

Model:

Quantum Mechanical Options

Tight-binding Energy:

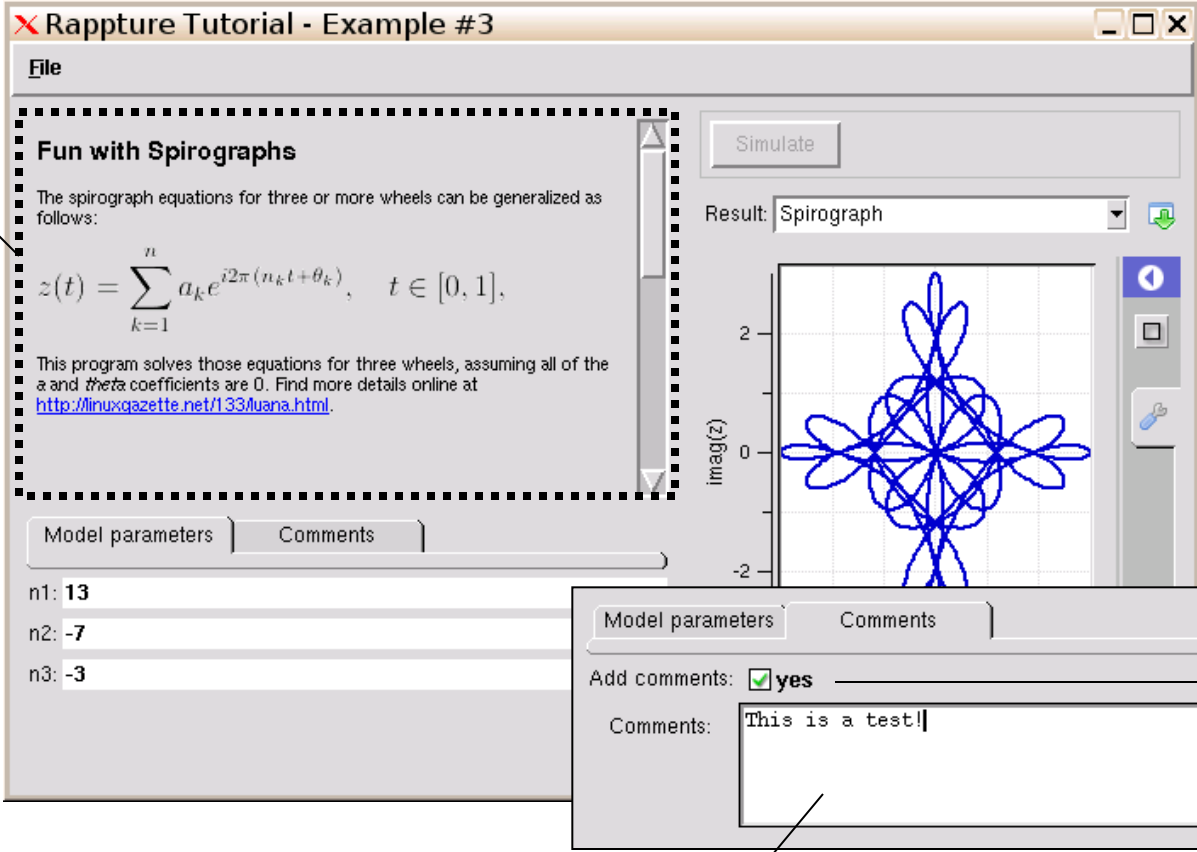
High-energy lifetime:

Group

Enable:

Assignment #2: Add options to Spirograph

- Add a note at the very top
- Add a “model parameters” tab and a “comments” tab
- When comments are enabled, produce an output string with comments



note

boolean

string

Enable/disable based on the boolean