



More Rappture Objects

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Groups



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.

2

Tool Interface:

- Tool:
- ⊕ Input:
 - ⊕ Group: tabs
 - ⊕ Group: models
 - Boolean: recomb
 - ⊕ Group: tau
 - Number: taun
 - Number: taup
 - ⊕ Group: ambient
 - Number: temp



Group of just groups ⇒ tabs
 Group with other elements ⇒ 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.



Use Enable condition to enable/disable inputs

Drift-Diffusion Options

Recombination Model: no

Minority Carrier Lifetime for electrons: 1e-6

Minority Carrier Lifetime for holes: 1e-6

Drift-Diffusion Options

Recombination Model: yes

Minority Carrier Lifetime for electrons: 1e-6

Minority Carrier Lifetime for holes: 1e-6

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

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

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 (cntl-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

Use Enable condition to enable/disable whole groups

Model: Drift-Diffusion Drift-Diffusion Options Recombination Model: <input type="checkbox"/> no Minority Carrier Lifetime for electrons: 1e-6 Minority Carrier Lifetime for holes: 1e-6	Group	Enable: <code>input.choice(model) == "dd"</code>
Model: Boltzmann Transport Equation Boltzmann Transport Equation Options Temperature: 300K	Group	Enable: <code>input.choice(model) == "bte"</code>
Model: Quantum Mechanical NEGF Quantum Mechanical Options Tight-binding Energy: 3.12eV High-energy lifetime: 10ns	Group	Enable: <code>input.choice(model) == "negf"</code>

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: **5nm**

Number of particles: **3**

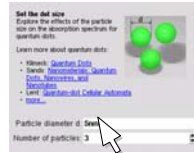
Set an ordinary HTML file

```

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



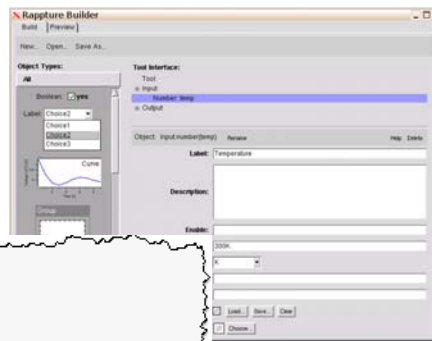
Example: [bysize.html](#)

```

<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</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 >
    
```

The builder is great, but it's not perfect

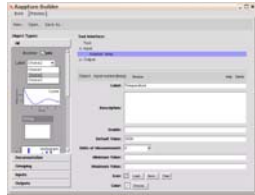


```

<max>1000K</max>
<default>300K</default>
<preset>
  <value>300K</value>
  <label>300K (room temperature)</label>
</preset>
<preset>
  <value>77K</value>
  <label>77K (liquid nitrogen)</label>
</preset>
</number>
    
```

Where are the preset controls?

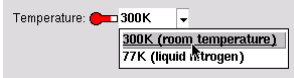
Builder



skeleton program



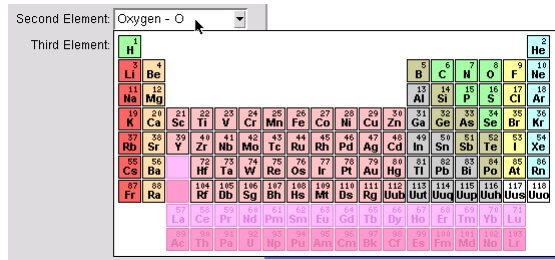
tool.xml



```
<?xml version="1.0"?>
<run>
  <tool>
    <title>Example with temperature</title>
  </tool>
  <input>
    <number id="temp">
      <about>
        <label>Temperature</label>
      </about>
      <default>300K</default>
      <units>K</units>
      <preset>
        <value>300K</value>
        <label>300K (room temperature)</label>
      </preset>
      <preset>
        <value>77K</value>
        <label>77K (liquid nitrogen)</label>
      </preset>
    </number>
  </input>
</run>
```

You can add stuff like this by hand

Prompt for elements from the periodic table

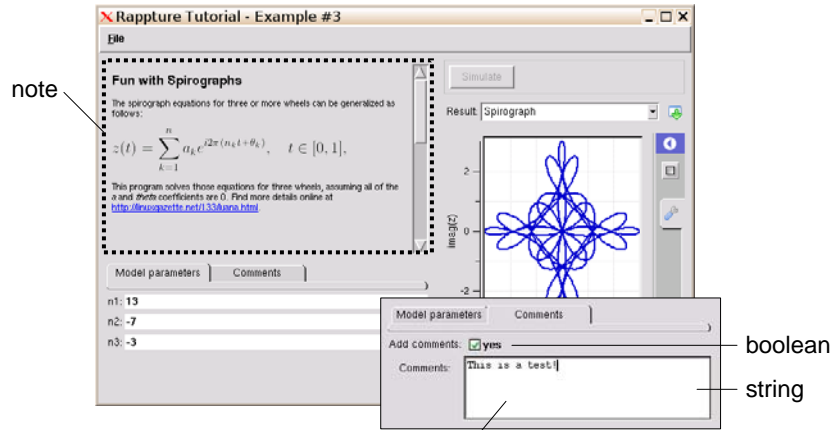


- actinoid
- alkali-metal
- alkaline-earth-metal
- halogen
- lanthanoid
- metalloid
- noble-gas
- other-non-metal
- post-transition-metal
- transition-metal
- unknown

```
<input>
  <periodic element id="second">
    <about> <label>Second Element</label> </about>
    <default>0</default>
    <nactive>lanthanoid actinoid</nactive>
    <returnvalue>symbol </returnvalue>
  </periodic element>
```

weight
number
name
symbol
all

- 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



Enable/disable based on the boolean