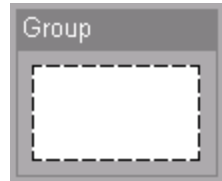


More Rappature Objects

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HUBzero® Platform for Scientific Collaboration
Purdue University



Use Group objects to group inputs together

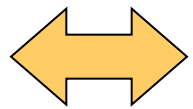
Tool Interface:

Tool:

⊕ Input:

- ⊕ Group: tau
 - Number: taun
 - Number: taup

⊕ 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.

Tool Interface:

Tool:

+ Input:

+ Group: tabs

+ Group: models

Boolean: recomb

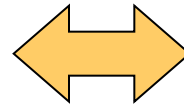
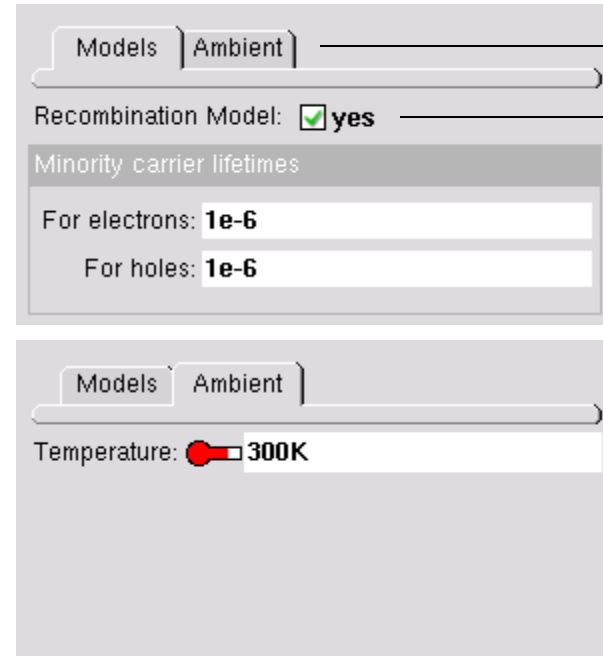
+ Group: tau

Number: taun

Number: taup

+ Group: ambient

Number: temp

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:

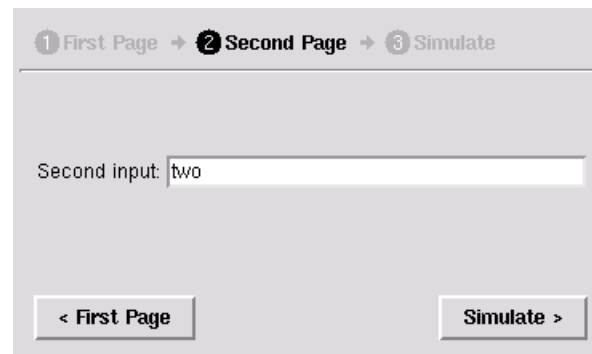
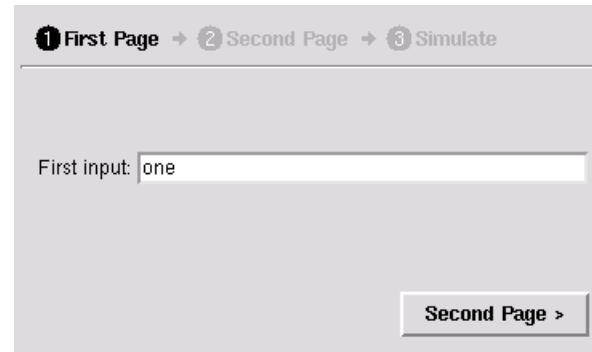
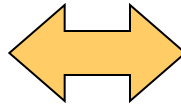
⊕ Input:

⊕ Phase: one

String: first

⊕ Phase: two

String: second



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

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

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: no

Minority Carrier Lifetime for electrons: **1e-6**

Minority Carrier Lifetime for holes: **1e-6**

Group

Enable: `input.choice(model) == "dd"`

Model: **Boltzmann Transport Equation**

Boltzmann Transport Equation Options

Temperature: **300K**

Group

Enable: `input.choice(model) == "bte"`

Model: **Quantum Mechanical NEGF**

Quantum Mechanical Options

Tight-binding Energy: **3.12eV**

High-energy lifetime: **10ns**

Group

Enable: `input.choice(model) == "negf"`

Use Note objects to embed documentation



Tool Interface:

Tool:

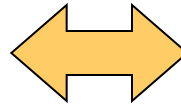
⊕ Input:

- 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

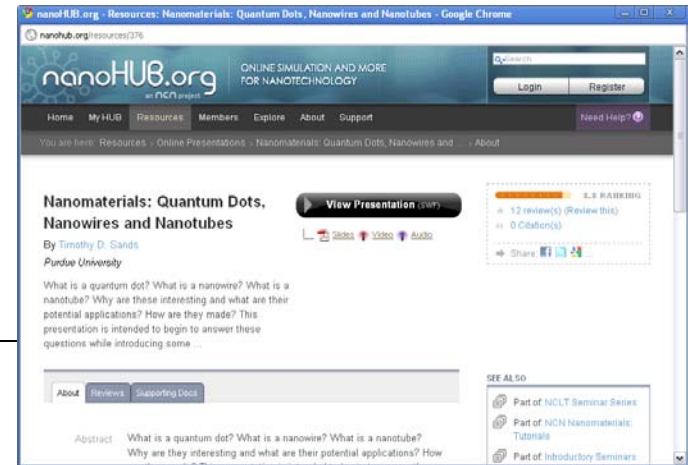
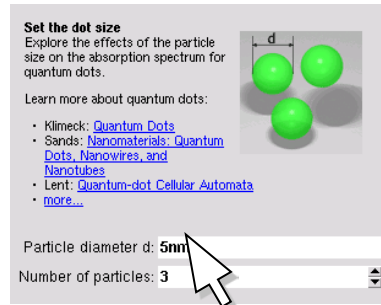
```

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 absorpion 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>
```

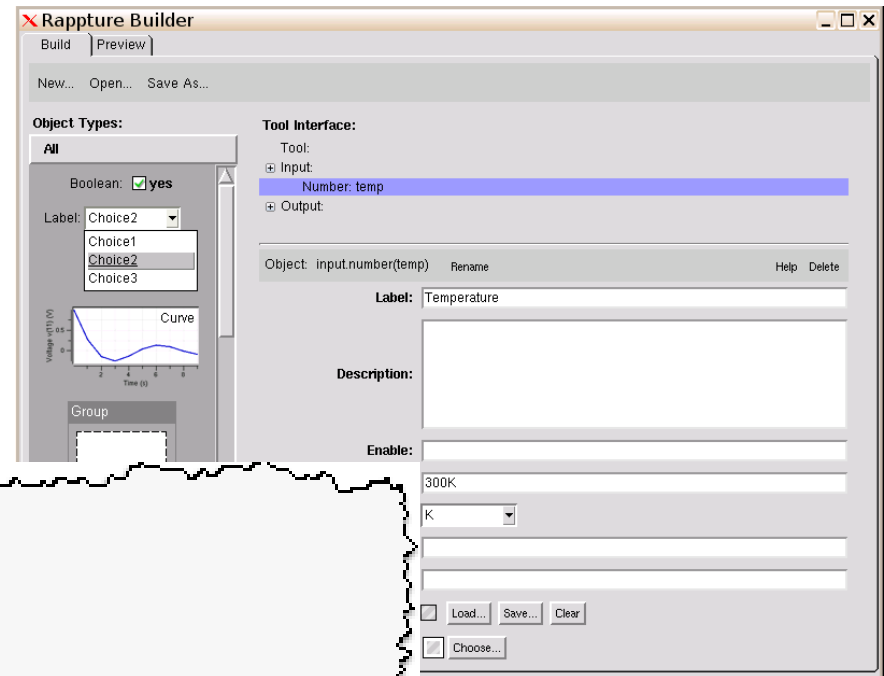
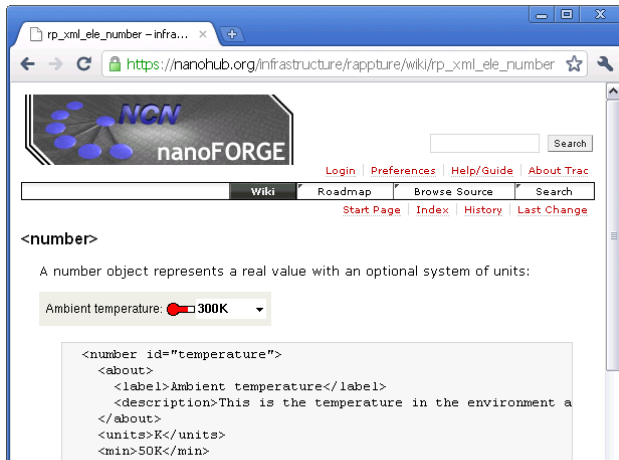
```
</ul >
```

```
</p>
```

```
</body>
```

```
</html >
```

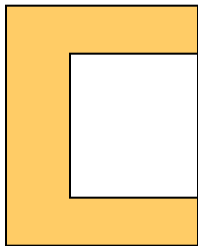
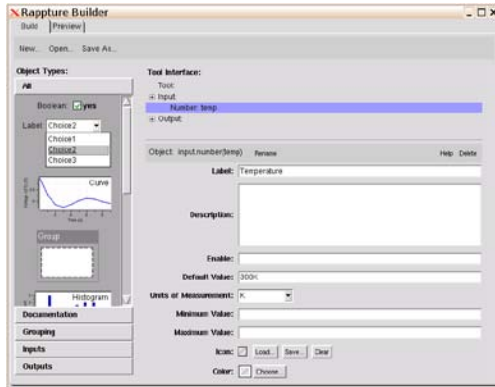
The builder is great, but it's not perfect



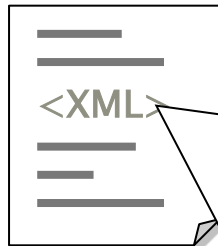
```
<max>1000K</max>
<default>300K</default>
<preset>
  <value>300K</value>
  <label>300K (room temperature)</label>
</preset>
<preset>
  <value>77K</value>
  <label>77K (liquid nitrogen)</label>
</preset>
</number>
```

*Where are the
preset controls?*

Builder



skeleton
program



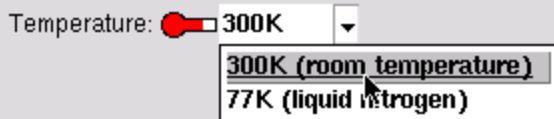
tool.xml

```

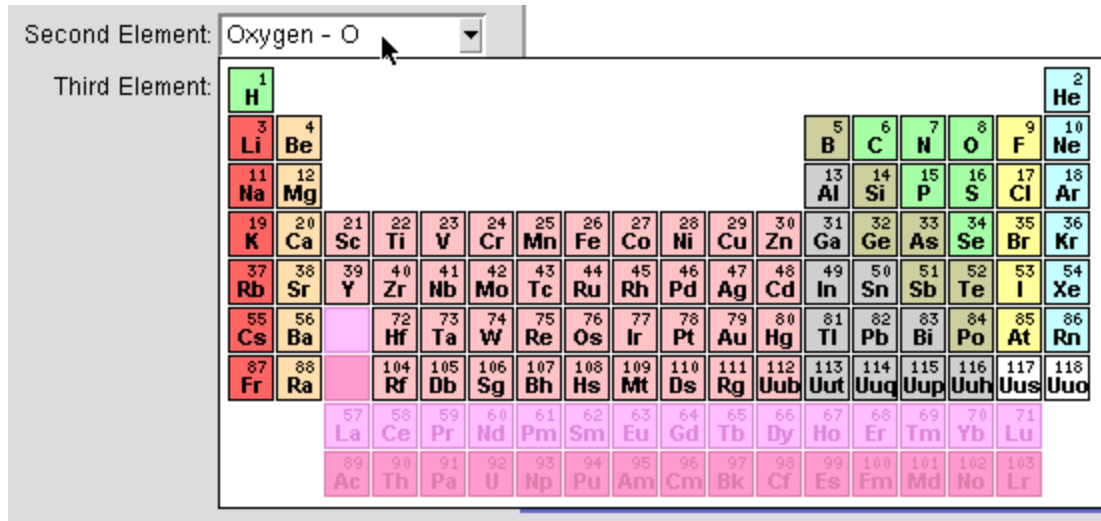
<?xml version="1.0"?>
<run>
  <tool>
    <title>Example with temperature</title>
  </tool>
  <input>
    <number id="temp">
      <about>
        <label>Temperature</label>
      </about>
      <default>300K</default>
      <units>K</units>
      <preset>
        <value>300K</value>
        <label>300K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

<inactive>lanthanoid actinoid</inactive>

<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

The screenshot shows the Rappture Tutorial - Example #3 window. The main area displays a spirograph plot with the imaginary part of the complex plane on the y-axis. The plot shows a blue spirograph pattern. The interface includes a 'Simulate' button, a 'Result' dropdown menu set to 'Spirograph', and a 'Comments' section with a checkbox for 'Add comments' (checked) and a text area containing 'This is a test!'. The 'Model parameters' section shows three parameters: n1: 13, n2: -7, and n3: -3. A dashed box highlights the 'Fun with Spirographs' note area, which contains the following text:

Fun with Spirographs

The spirograph equations for three or more wheels can be generalized as follows:

$$z(t) = \sum_{k=1}^n a_k e^{i2\pi(n_k t + \theta_k)}, \quad t \in [0, 1],$$

This program solves those equations for three wheels, assuming all of the a and θ coefficients are 0. Find more details online at <http://linuxgazette.net/133/uana.html>.

Labels in the image point to the 'note' (dashed box), the 'boolean' (checkbox), and the 'string' (text area).

Enable/disable based on the boolean