



More Rappture Objects

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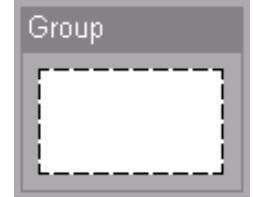
HUBzero® Platform for Scientific Collaboration

Purdue University

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Use Group objects to group inputs together

Tool Interface:

Tool:

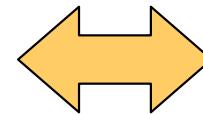
+ Input:

+ 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

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

Description:

Minority carrier lifetimes

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



Tool Interface:

Tool:

+ Input:

+ Group: tabs

+ Group: models

Boolean: recomb

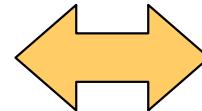
+ Group: tau

Number: taun

Number: taup

+ Group: ambient

Number: temp



Models Ambient

Recombination Model: yes

Minority carrier lifetimes

For electrons: **1e-6**

For holes: **1e-6**

Models Ambient

Temperature: **300K**

Group of just groups \Rightarrow tabs

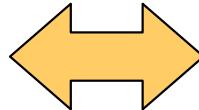
Group with other elements \Rightarrow box with group contents



Use Phase objects to create input panels

Tool Interface:

Tool:
⊕ Input:
 ⊕ Phase: one
 String: first
 ⊕ Phase: two
 String: second



① First Page → ② Second Page → ③ Simulate

First input:

Second Page >

① First Page → ② Second Page → ③ Simulate

Second input:

< First Page Simulate >



* 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: the

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: the

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

i nput. (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"`



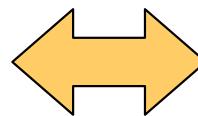
Use Note objects to embed documentation

Tool Interface:

Tool:
+ Input:
 Note: note
 Number: diameter
 Integer: num
+ Output:

Object: input.note(note) Rename Help Delete

HTML File: <file:///docs/bysize.html> 



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

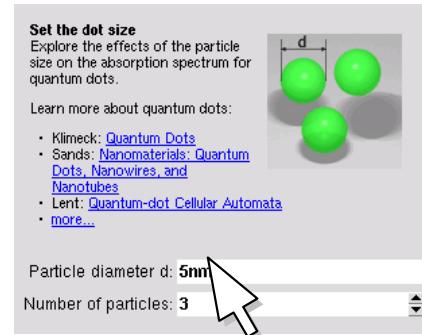


Note can pop up external web sites

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, Nanowires, and Nanotubes</a>
<li>Lent: <a href="http://www.nanohub.org/resources/148">Quantum-dot Cellular Automata</a>
<li><a href="http://www.nanohub.org/resources/tags/quantumdots">more...</a></li>
</ul>
</p>
</body>
</html>
```

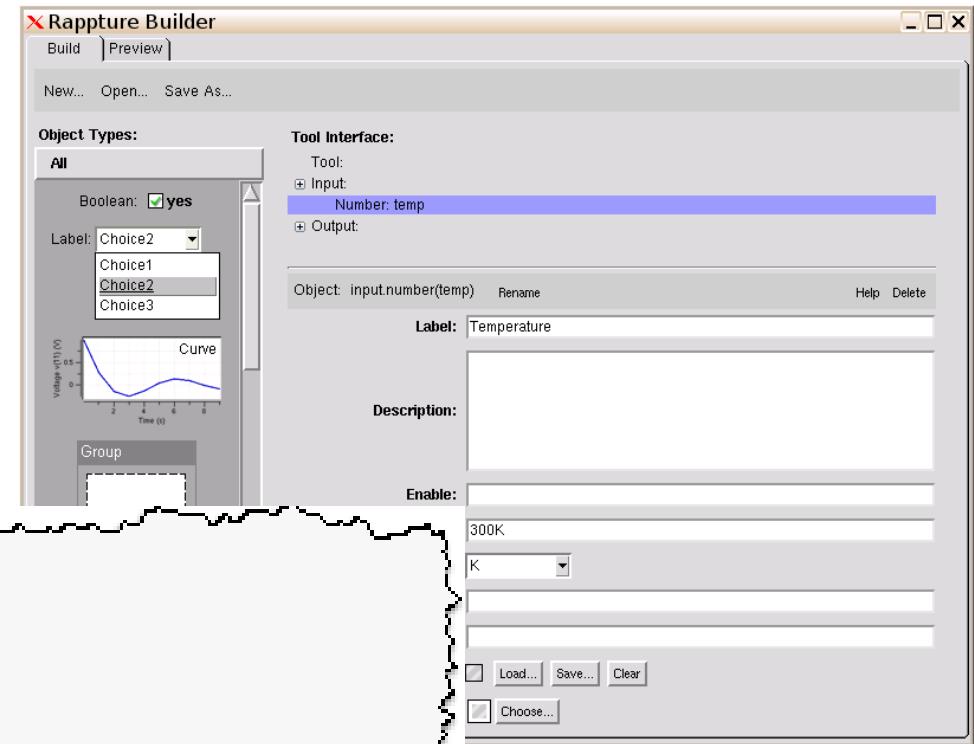


The screenshot shows a web browser window displaying a presentation on nanoHUB.org. The title of the presentation is "Nanomaterials: Quantum Dots, Nanowires and Nanotubes" by Timothy D. Sands from Purdue University. The abstract asks what a quantum dot is, what a nanowire is, and what a nanotube is, and why they are interesting and what their potential applications are. The presentation has a rating of 8.8 and 12 reviews. The sidebar on the right lists "SEE ALSO" links to other presentations: Part of NCLT Seminar Series, Part of NCN Nanomaterials Tutorials, and Part of Introductory Seminars.



The builder is great, but it's not perfect

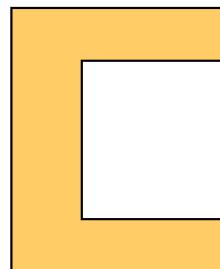
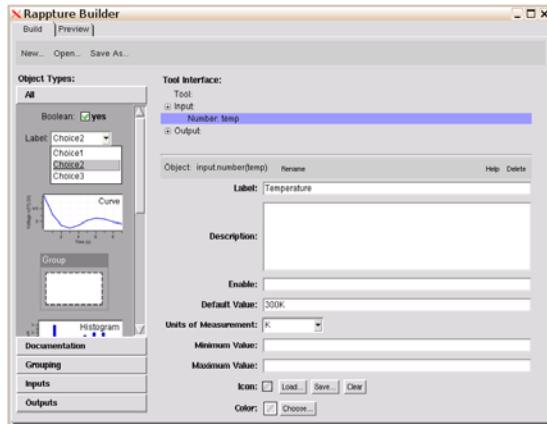
```
<number>
  A number object represents a real value with an optional system of units:
  Ambient temperature: 300K
  <number id="temperature">
    <about>
      <label>Ambient temperature</label>
      <description>This is the temperature in the environment a
    </about>
    <units>K</units>
    <min>50K</min>
    <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>
```



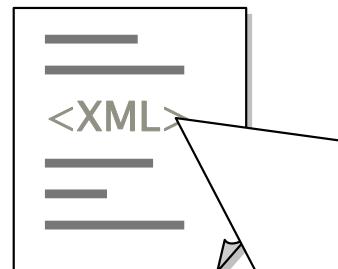
Where are the
preset controls?



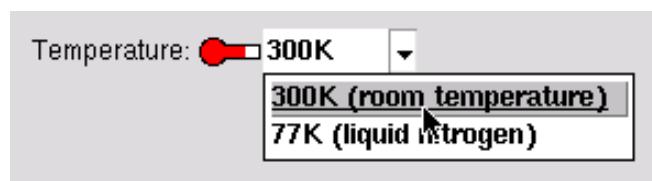
Builder



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

Second Element: Oxygen - O

Third Element:

acti noi d
al kal i -metal
al kal i ne-earth-metal
hal ogen
I anthanoi d
metal l oi d
nobl e-gas
other-non-metal
post-transi ti on-metal
transi ti on-metal
unknown

<input>

```
<peri odi cel ement id="second">
  <about> <label>Second El ement</label> </about>
  <default>0</default>
  <inactive>I anthanoi d acti noi d</inactive>
  <returnvalue>symbol </returnvalue>
</peri odi cel ement>
```

...

wei ght
number
name
symbol
al l



Assignment #7: 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

The screenshot shows a Rappture application window titled "Rappture Tutorial - Example #3". The main area displays a "Fun with Spirographs" note containing the formula $z(t) = \sum_{k=1}^n a_k e^{i2\pi(n_k t + \theta_k)}$ and a link to a detailed explanation. Below the note is a plot of a spirograph curve. At the bottom, there are two tabs: "Model parameters" and "Comments". The "Model parameters" tab contains sliders for n1 (set to 13), n2 (-7), and n3 (-3). The "Comments" tab has an "Add comments:" field with a checked checkbox labeled "yes" and a "Comments:" text area containing the string "This is a test!". A callout points to the "Comments:" text area with the label "string". Another callout points to the "Add comments:" checkbox with the label "boolean". A third callout points to the "Model parameters" tab with the label "Enable/disable based on the boolean".

note

Model parameters Comments

n1: 13
n2: -7
n3: -3

Add comments: yes

Comments: This is a test!

boolean

string

Enable/disable based on the boolean