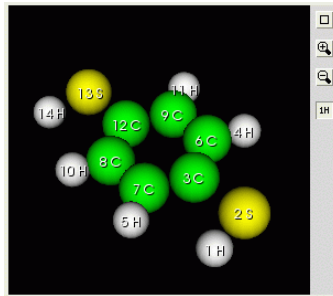


More Rappture Objects

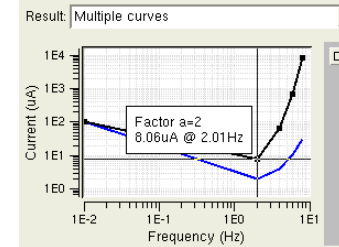


Carrier Statistics:

- Boltzmann
- Fermi**
- 2D Gas

Grid points:

Ambient temperature:



Michael McLennan
Software Architect

HUBzero™ Platform for Scientific Collaboration

Group related elements

Minority carrier lifetimes

For electrons: **1e-6**

For holes: **1e-6**

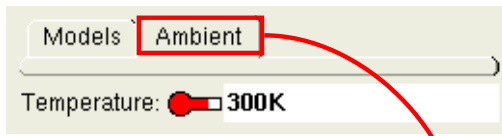
```
<group id="tau" >
  <about>
    <label>Minority carrier lifetimes</label>
  </about>

  <number id="taun">
    <about> <label>For electrons</label> </about>
    <default>1e-6</default>
  </number>

  <number id="taup">
    <about> <label>For holes</label> </about>
    <default>1e-6</default>
  </number>
</group>
```

<group>

Group of groups → tabs



```
<group id="tabs">

  <group id="models">
    <about> <label>Models</label> </about>
    ...input elements for this tab...
  </group>

  <group id="ambient">
    <about> <label>Ambient</label> </about>
    <number id="temp">
      <about> <label>Temperature</label> </about>
      <units>K</units>
      <default>300K</default>
    </number>
  </group>

</group>
```

Enable/disable to remove clutter

Disable inputs when they're not needed

Recombination Model: no

Minority Carrier Lifetime for electrons: 1e-6

Minority Carrier Lifetime for holes: 1e-6

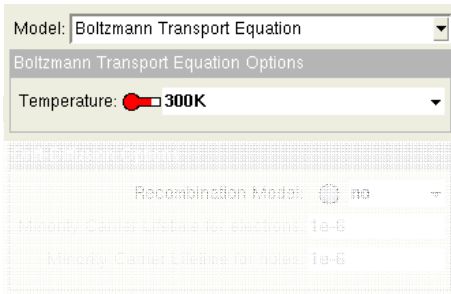
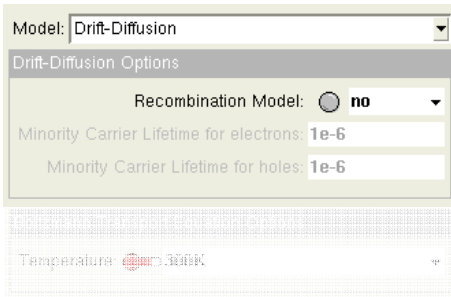
Enabled only when
Recombination Model is "yes"

```
<i nput>
  <boolean id="recomb">
    <about>
      <label>Recombination Model</label>
    </about>
    <default>off</default>
  </boolean>

  <number id="taun">
    <about>
      <label>Minority Carrier Lifetime for electrons</label>
      <enable>input.bool.ean(recomb)</enable>
    </about>
    <default>1e-6</default>
  </number>
  ...
```

Enable/disable to remove clutter

Disable a group to hide all of the controls within it



```

<group id="dd" > Show this panel when
                    Model is set to "dd" (Drift-Diffusion)
  <about>
    <label >Dri ft-Di ffusi on Opti ons</label >
    <enabl e>i nput. choi ce(model ) == "dd" </enabl e>
  </about>
  ...
</group>

<group id="bte" > Show this panel when
                    Model is set to "bte" (Boltzmann Transport Eqn)
  <about>
    <label >Bol tzmann Transp ort Equati on Opti ons</label >
    <enabl e>i nput. choi ce(model ) == "bte" </enabl e>
  </about>
  ...
</group>

```

Enable/disable based on numbers

Quantum Mechanical Options

Tight-binding Energy: **2.9eV**

High-energy lifetime: **10ns**

Enabled only when
Tight-binding energy \geq 3eV

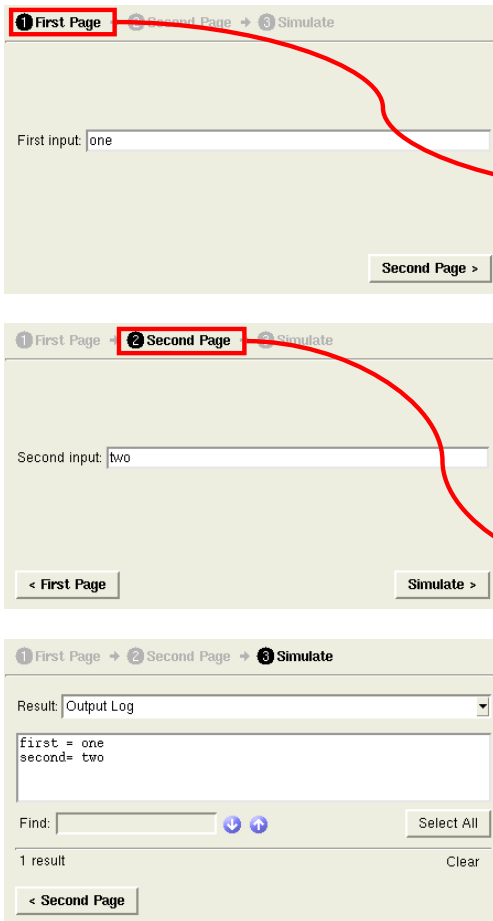
```

<i nput>
  <group id="negf">
    <about><label>Quantum Mechanical Options</label></about>
    <number id="tbe">
      <about> <label>Tight-binding Energy</label> </about>
      <units>eV</units>
      <default>3.12eV</default>
    </number>
    <number id="tau">
      <about>
        <label>High-energy lifetime</label>
        <enable>input.group(negf).number(tbe):eV >= 3</enable>
      </about>
      <units>ns</units>
      <default>10ns</default>
    </number>
  </group>
  ...
  
```

XML way of saying \geq

Convert value to eV

Multiple pages of inputs, needed only for complex tools



<i nput >

<phase i d="one" >

<about > <l abel >Fi rst Page</l abel > </about >

<stri ng i d="fi rst" >

<about > <l abel >Fi rst i nput</l abel > </about >

<defaul t>one</defaul t >

</stri ng >

</phase >

<phase i d="two" >

<about > <l abel >Second Page</l abel > </about >

<stri ng i d="second" >

<about > <l abel >Second i nput</l abel > </about >

<defaul t>two</defaul t >

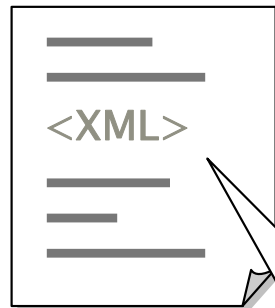
</stri ng >

</phase >

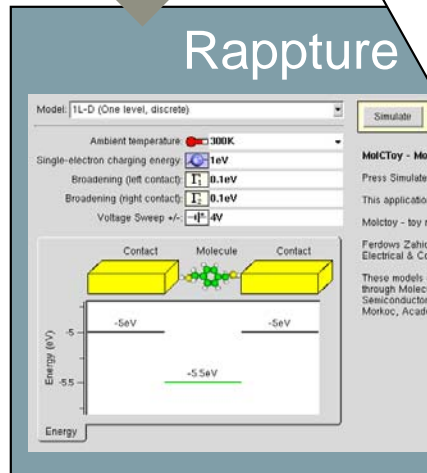
</i nput >

Focus on <output> side of tool.xml

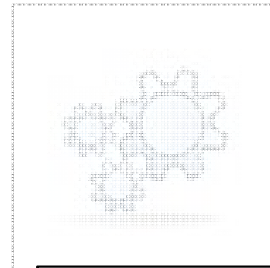
description of tool,
including inputs
and outputs



tool.xml



Produces the
user interface
automatically!



```

<?xml version="1.0"?>
<run>
  <tool >
    <about>This is my tool.</about>
    ...
  </tool >
  <i nput >
    [Red dashed box]
  </i nput >
  <output >
    [Green solid box]
  </output >
</run>

```


Standard output from simulator

```

Result: Output Log
***** ADEPT/F - 2.1 input file: adp20638

1 *title input generated by adeptwr

2 mesh nx=250 xres=0.5
3 misc tempk=300

4 * layer Al(0.3)Ga(0.7)As
5 layer tm=0.2 nd=1e+17
6 + eg=1.797 chi=3.827 ks=11.9
7 + nc=8.57e+17 nv=1.11e+19
    
```

Controls for search through text

Treated as unimportant
(low level) output, and
therefore listed last

```

<output>
  <log>***** ADEPT/F - 2.1 input
file: adp20638 Sat Jul 30 19:39:36
2005 *****

  1 *title input generated by adeptwr

  2 mesh nx=250 xres=0.5
  3 mi sc tempk=300

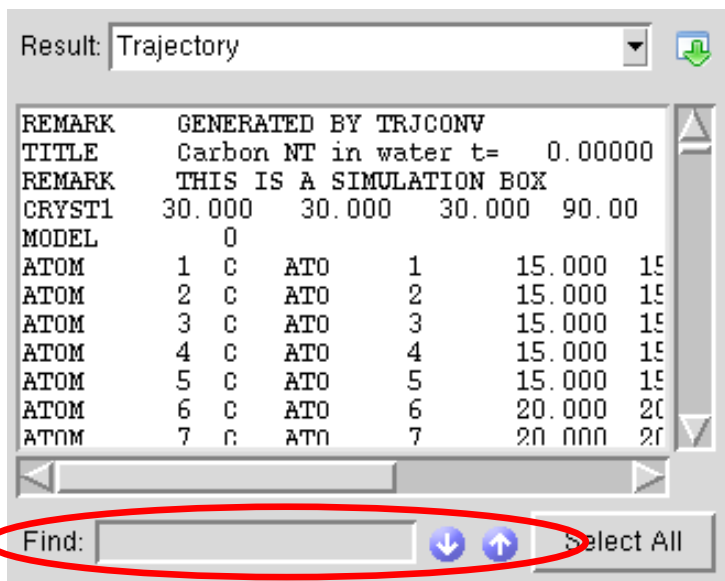
  ...
</log>
</output>
    
```

or, in Python...

```

import Rappture
import sys
driver = Rappture.Li brary(sys. argv[1])
...
driver. put(' output. log' , stdout)
    
```

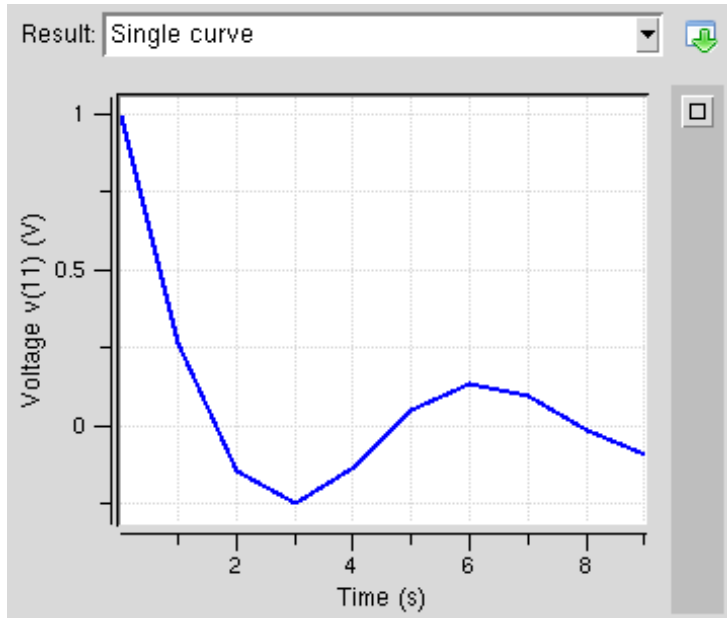
Other output files from simulator—including binary files



Controls for search through text

```
import Rappture
import sys
driver = Rappture.Library(sys.argv[1])
...
path = 'output.string(traj)'
```

```
<output>
  <string id="traj">
    <about>
      <label>Trajectory Data</label>
      <description>Data in pdb
    </description>
    </about>
    <current>REMARK    GENERATED BY
TRJCONV
TITLE     Carbon NT in water t=  0.00000
...
    </current>
  </string>
</output>
```

X-Y plots

```

import Rappture
import sys
driver = Rappture.Library(sys.argv[1])
...
path = 'output.curve(single)'

driver.put(path+'.about.label',
           'Single curve')

driver.put(path+'.xaxis.label', 'Time')
driver.put(path+'.xaxis.units', 's')
driver.put(path+'.yaxis.label', 'Voltage')
driver.put(path+'.yaxis.units', 'V')

data = ""
0 0
1 2
3 4 ""
driver.put(path+'.component.xy', data)

```

Tour the zoo

rappture_xml_elements - Rappture - Trac - Mozilla Firefox

Getting Started Latest Headlines

NGN nanoFORGE

Wiki Timeline Browse Source View Tickets Search

Zoo of Inputs/Outputs

Welcome to the zoo of Rappture elements! This page shows the various snippets of XML code needed to create a Rappture tool.xml file.

Overall Structure

Each tool is described by a tool.xml file, which has the following structure:

```
<?xml version="1.0"?>
<root>
  <tool>
    <title>Name of the tool</title>
    <about>Description and credits</about>
    <command>
      @tool/path/to/executable @driver
    </command>
    <limits>
      <cpulimit>900</cpulimit>
      <filesize>1000000</filesize>
    </limits>
    <layout>xxx</layout>
    <control>xxx</control>
    <analyser>xxx</analyser>
    <reportJobFailures>1</reportJobFailures>
  </tool>
  <input>
    ..see Element Index below...
  </input>
  <output>
    ..see Element Index below...
  </output>
</root>
```

The <tool> section describes the underlying compute engine and includes the command needed to run it. This can be any Unix-style command line. The @tool keyword gets replaced with the name of the directory containing the tool.xml file. The

Carrier Statistics: Fermi
Boltzmann
Fermi
2D Gas

Ambient temperature: 300K

Grid points: 100

Zoo of Examples

- Complete catalog of data objects online
- See screen shots
- Copy xml code

Exercise #4: More controls for Spirograph

1) Create two groups of controls:

The screenshot shows two instances of the Spirograph control interface. The top instance has the 'Model Parameters' tab selected, showing input fields for n1 (13), n2 (-7), and n3 (-3). The bottom instance has the 'Comments' tab selected, showing 'Add comments: no' and a text area for comments. A 'Simulate' button is highlighted in yellow in both panels.

Exercise #4: Spirographs

This is the solution for Exercise #4 in the
Tutorial for HUBhub 2010. For more details on the
Rappture toolkit, visit <http://rappture.org>

2) When comments are enabled, create a <string> output with comments

The screenshot shows the Spirograph control interface with 'Add comments: yes' checked. The 'Comments:' text area contains the text 'These are my comments for the run. They show up in output.'. The 'Result:' dropdown menu is set to 'Comments about this run' and is circled in red. The output area shows the same comment text.