

# Using the Loader

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loader

The screenshot shows a software interface for a 'loader'. At the top left, there is a dropdown menu labeled 'Example:' with a context menu open. The context menu items are: 'New', 'Upload...', 'Download', '---', 'Change both', 'Change first', and 'Change second'. A mouse cursor is pointing at 'Change both'. To the right of the dropdown is a 'Simulate' button and a yellow highlighted area containing the text 'new input parameters'. Below the dropdown are three input fields: 'Input #1:', 'Input #2:', and 'Mass: 10g'. To the right of these fields is a text area containing the following text:

**loader**

Example of a Rapture <loader> object.

A loader is used to load values into the interface from example files. The example files have the same format as the tool.xml file that they are being loaded into. In fact, they can be generated by running the tool and saving the output run.xml file. In you look in the example files, you'll see that each one also has an <about> section with a label and a description. These show up in the loader control.

The description appears in a tooltip when you hover over the loader control with your mouse.

You can see the real action here by selecting various examples from the loader. The simulate button doesn't do very much. It just copies the inputs to the output log.

Change both

Change first

Change second

New

Input #1: first

Input #2: second

Mass: **10g**

Input #1: hello

Input #2: second

Mass: **10g**

Input #1: hello

Input #2: goodbye

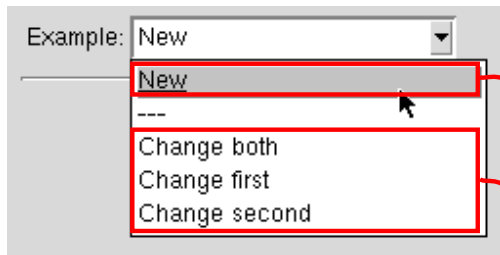
Mass: **10g**

Input #1: (enter a value here)

Input #2: (enter a value here)

Mass: **10g**

*Put the loader definition in your input section, usually near the top:*



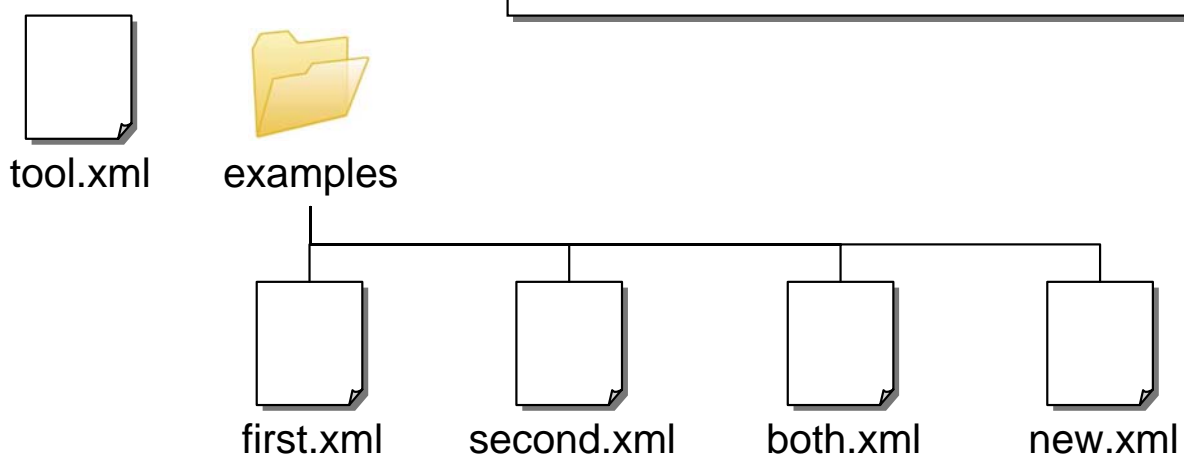
```

<loader>
  <about>
    <label>Example</label>
    <description>This loads examples.</description>
  </about>

  <new>new.xml</new>
  <example>*.xml</example>

  <default>new.xml</default> ——— Load by default
</loader>
  
```

These files sit in  
@tool /examples  
@tool is where tool.xml sits



## How do you make an example file?

```
cp tool.xml examples/both.xml
```

```
vi examples/both.xml
```

Add a description  
for the example

```
<?xml version="1.0"?>
<run>
  <about>
    <label>Change both</label>
    <description>This example changes both inputs,
    #1 to "first" and #2 to "second"</description>
  </about>
```

Set a <current>  
value for each  
element you want  
to set

```
...
<input>
  <string id="one">
    <current>first</current>
  </string>
  <string id="two">
    <current>second</current>
  </string>
</input>
</run>
```

loader

Device: 3-barrier device

Ambient temperature: 300K

Applied bias: 0V

Thickness B1: 5nm

Thickness W1: 5nm

Thickness B2: 5nm

Thickness W2: 5nm

Thickness B3: 5nm

Contact B1 W1 B2 W2 B3 Contact

Doping (/cm<sup>3</sup>)

1E19

1E18

1E17

1e+18/cm<sup>3</sup>

1e+18/cm<sup>3</sup>

Doping Mole Fraction x

loads a <structure> element

Simulate new input parameters

About this tool Questions?

### Resonant Tunneling Diodes

leaves these alone

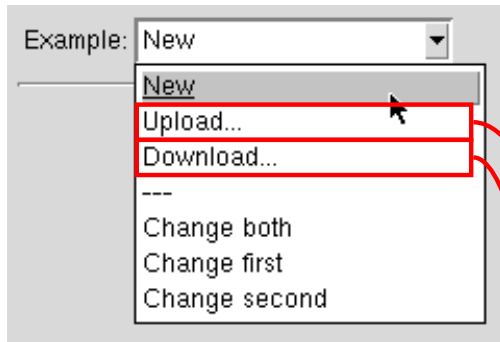
Highly levels of resonant tunneling diodes produces negative differential resistance. Study the effects of various material layers and their properties on I/V characteristics.

Choose a structure from the list on the left. The structures are composed of a stack of material layers with either pure GaAs or AlGaAs with a mole fraction  $x$  (representing the amount of Al in the alloy). With  $x=0$ , the material is pure GaAs. With higher values of  $x$ , the added Al increases the band gap and the effective mass, creating barriers to electronic conduction. Adjust doping densities and material properties if you like, then push the Simulate button. Simulation results will appear here.

This application is powered by:  
 SEQUAL: Semiconductor Electrostatics by QUantum AnaLysis (v2.1)  
 written by Michael McLennan, School of Electrical Engineering, Purdue University, 1989.

<https://nanohub.org/tools/rtd>

## Add targets for upload/download forms



Prompts the user to upload directly into various controls

Most useful for `<string>` inputs

Allows the user to download input values, edit, and upload again

```

</loader>
  <about>
    <label>Example</label>
    <description>This loads examples.</description>
  </about>
  <upload>
    <to>input.string(index)</to>
    <to>input.string(datafile)</to>
  </upload>
  <download>
    <from>input.string(index)</from>
    <from>input.string(datafile)</from>
  </download>

  <new>new.xml</new>
  <example>*.xml</example>

  <default>new.xml</default>
</loader>
  
```

Add a <loader> to the Rappture interface for your MATLAB script:

Examples: Flower  
 Fancy cross  
 Flower  
 Palm branch

Fun with

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  $\theta$  coefficients are 0. Find more details online at <http://linuxgazette.net/133/uana.html>.

Model parameters | Comments

n1: 19  
 n2: -13  
 n3: 3

Simulate

Result: Spirograph

1 result Parameters... Clear

Include these examples	Fancy cross	Flower	Palm Branch
	$n_1 = 13$	$n_1 = 19$	$n_1 = 7$
	$n_2 = -7$	$n_2 = -13$	$n_2 = -5$
	$n_3 = -3$	$n_3 = 3$	$n_3 = 2$