Interface parallel session report

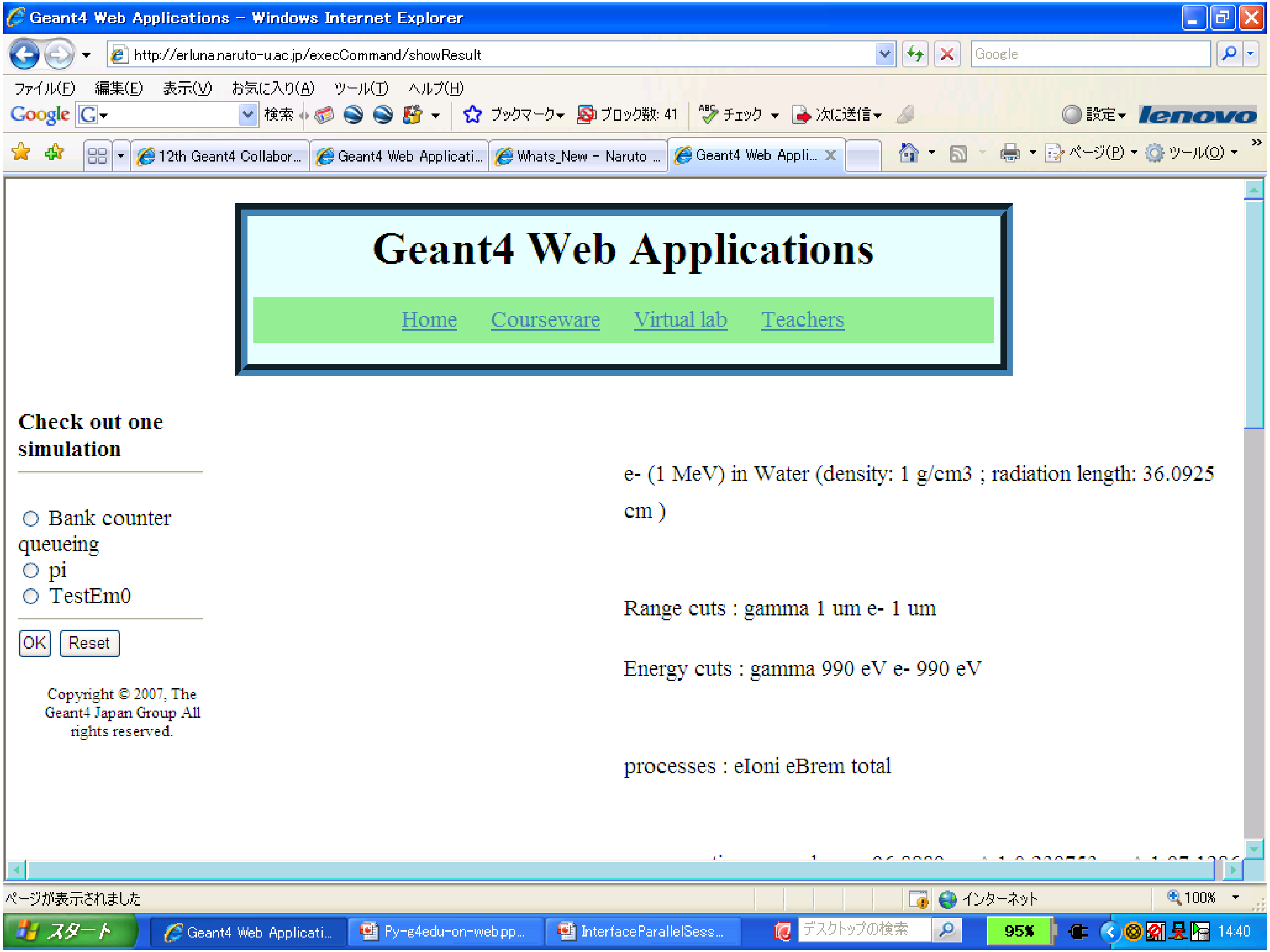
Hajime Yoshida

Presentation 1

- Hajime presented “Geant4 Web Applications – its design and use”
  - Web framework based on MVC model
  - Working examples of the model
    - Pythonized Geant4
    - SimPy, a discrete system simulation
    - User written simulation
  - Demonstration of the running prototype web server
  - Possible use cases

Model which produces data

- Geant4’s outputs can be sent to client
  - G4cout, by SetG4coutDestination to client’s browser
  - File output to client’s browser
  - Visualization outputs
    - Heprep files to client’s Wired
    - Vrml file to client’s VRML viewers
    - Dawn file to client’s DawnViewer
    - OpenGL’s PS file to client’s PS viewer <= John recalled us this
  - Analysis output
    - Root file to client’s Root
    - Root’s JPEG file to client’s viewer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Py-g4edu-on-web.pp...
InterfaceParallelSess...
デスクトップの検索
95%
14:40

Geant4 Web Applications

Home Courseware Virtual lab Teachers

Check out one simulation

○ Bank counter queueing
○ pi
○ TestEm0

OK Reset

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e- (1 MeV) in Water (density: 1 g/cm3 ; radiation length: 36.0925 cm)

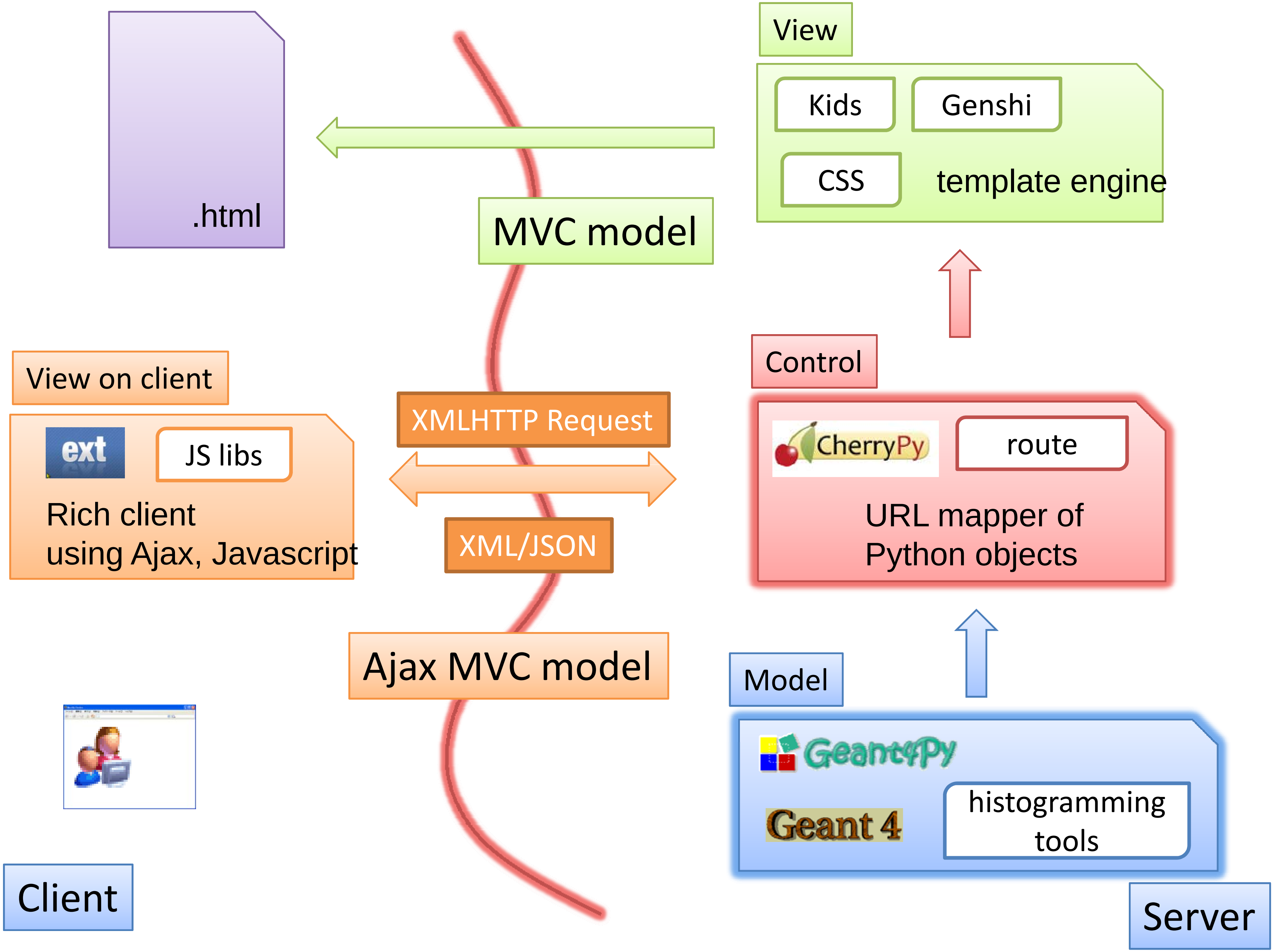
Range cuts : gamma 1 um e- 1 um

Energy cuts : gamma 990 eV e- 990 eV

processes : eIoni eBrem total

Presentation 2

- Koichi presented mainly the client side design and prototype implementation using Ajax
- Web 2.0 or rich client is our pre-requisite
  - Better user interaction, like the typical example of Google map
  - Design transparency: GUI programming is now separated from Geant4 and is moved to client side
  - Communication with Web server is based on DOM or JSON, in the context of Ajax
- Ajax based GUI
  - Design for Geant4 for Education and implementation using Ext.js, an Ajax library
  - Design of Geant4 Virtual laboratory



.html

View

Kids

Genshi

CSS

template engine

MVC model

View on client

ext

JS libs

Rich client
using Ajax, Javascript

XMLHTTP Request

XML/JSON

Control

CherryPy

route

URL mapper of
Python objects

Ajax MVC model

Model

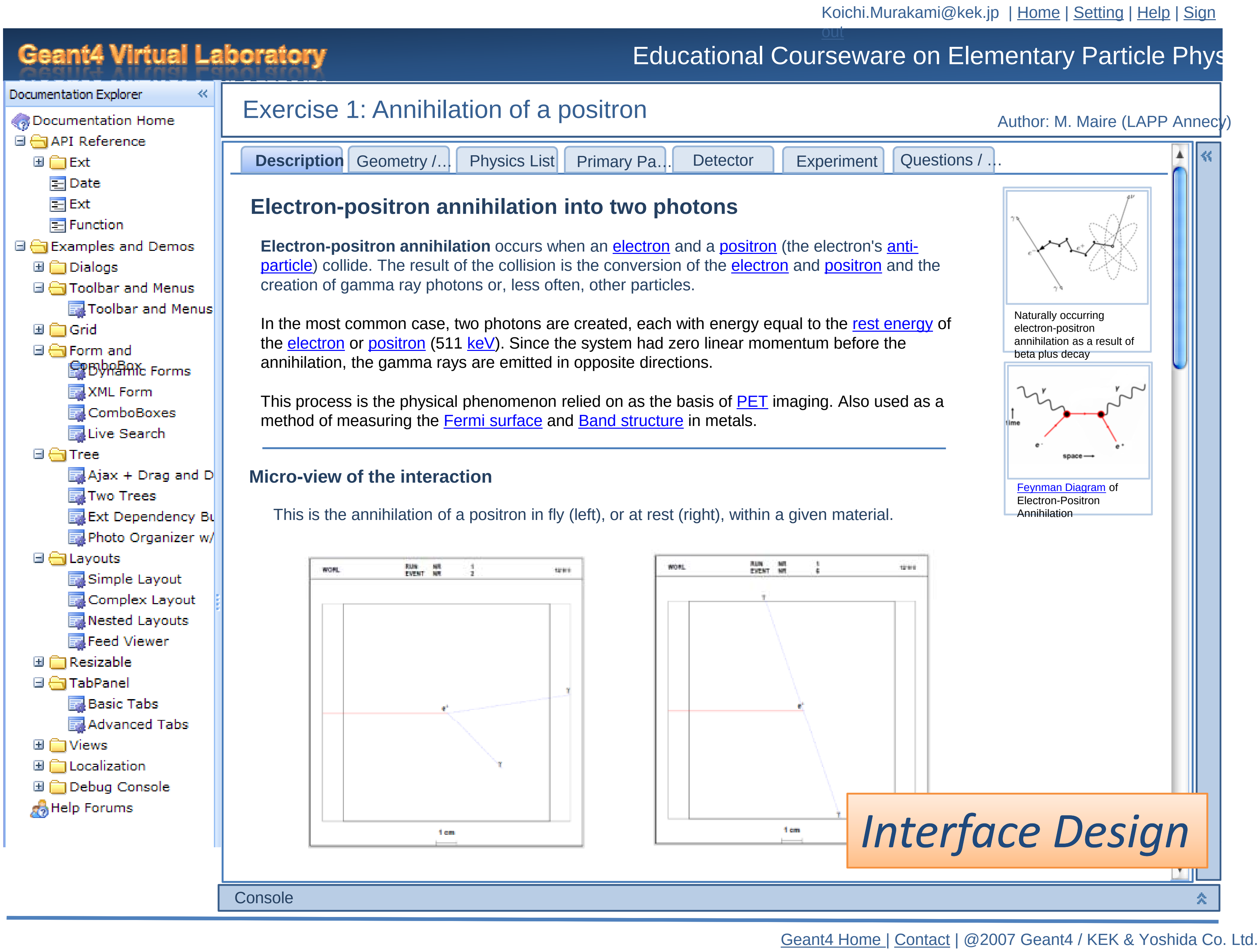
Geant4Py

Geant 4

histogramming
tools

Client

Server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Documentation Explorer
Documentation Home
API Reference
Ext
Date
Ext
Function
Examples and Demos
Dialogs
Toolbar and Menus
Toolbar and Menus
Grid
Form and ComboBox
Dynamic Forms
XML Form
ComboBoxes
Live Search
Tree
Ajax + Drag and D
Two Trees
Ext Dependency Bu
Photo Organizer w/
Layouts
Simple Layout
Complex Layout
Nested Layouts
Feed Viewer
Resizable
TabPanel
Basic Tabs
Advanced Tabs
Views
Localization
Debug Console
Help Forums
Description
Geometry /…
Physics List
Primary Pa…
Detector
Experiment
Questions / …
WORL
RUN NR 1
EVENT NR 2
e+
γ
1 cm
Time
space
e-
e+
γ
Console

Exercise 1: Annihilation of a positron

Author: M. Maire (LAPP Annecy)

Electron-positron annihilation into two photons

Electron-positron annihilation occurs when an electron and a positron (the electron's anti-particle) collide. The result of the collision is the conversion of the electron and positron and the creation of gamma ray photons or, less often, other particles.

In the most common case, two photons are created, each with energy equal to the rest energy of the electron or positron (511 keV). Since the system had zero linear momentum before the annihilation, the gamma rays are emitted in opposite directions.

This process is the physical phenomenon relied on as the basis of PET imaging. Also used as a method of measuring the Fermi surface and Band structure in metals.

Naturally occurring electron-positron annihilation as a result of beta plus decay

Feynman Diagram of Electron-Positron Annihilation

Micro-view of the interaction

This is the annihilation of a positron in fly (left), or at rest (right), within a given material.

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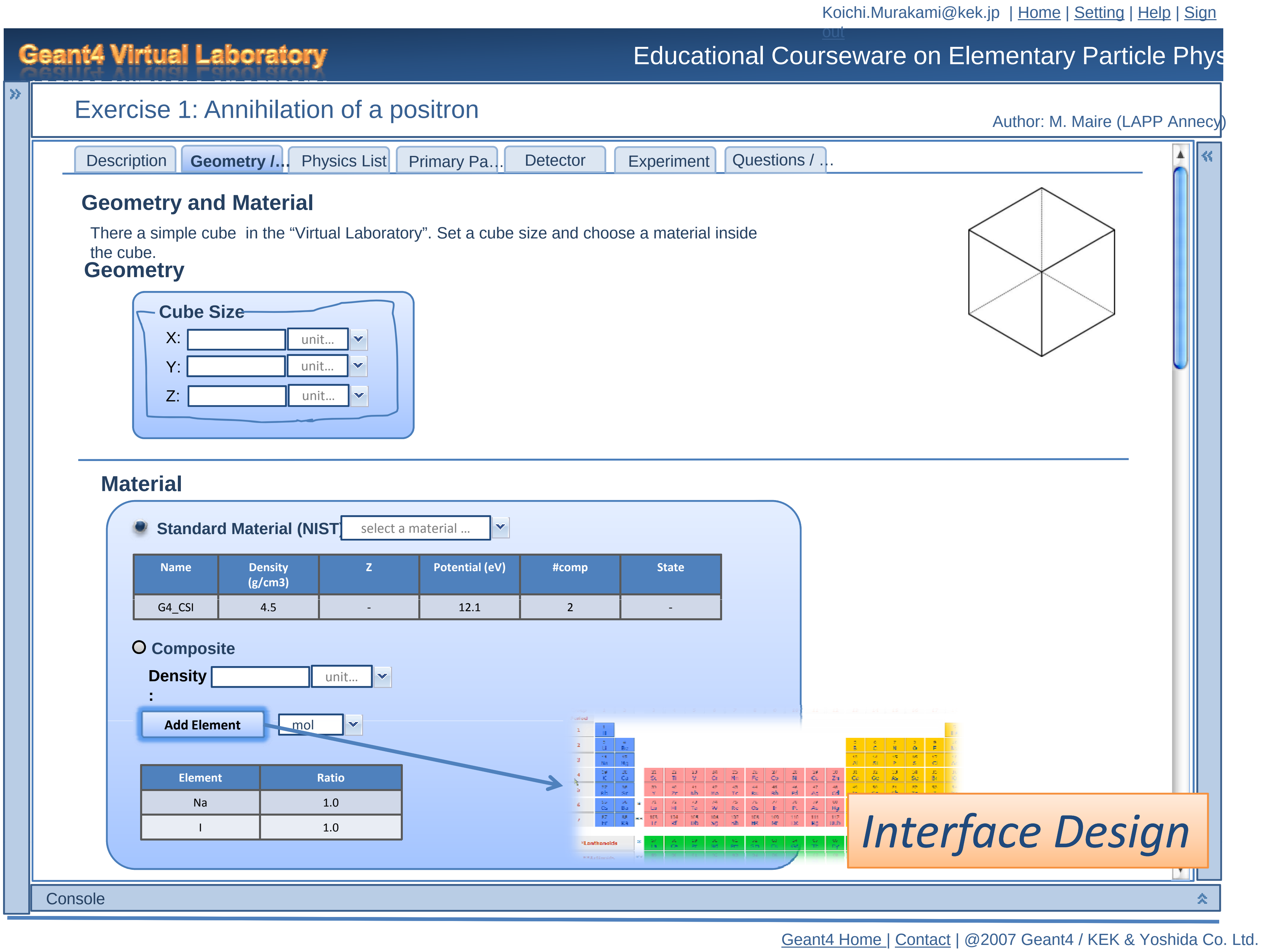
Interface Design



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Geant4 Virtual Laboratory

Educational Courseware on Elementary Particle Phys

Exercise 1: Annihilation of a positron

Author: M. Maire (LAPP Annecy)

Description
Geometry /…
Physics List
Primary Pa…
Detector
Experiment
Questions / …

Geometry and Material

There a simple cube in the “Virtual Laboratory”. Set a cube size and choose a material inside the cube.

Geometry

Cube Size

X: unit…

Y: unit…

Z: unit…

Material

● **Standard Material (NIST)** select a material …

Name	Density (g/cm3)	Z	Potential (eV)	#comp	State
G4_CSI	4.5	-	12.1	2	-

○ **Composite**

Density : unit…

Add Element

mol

Element	Ratio
Na	1.0
I	1.0

Interface Design

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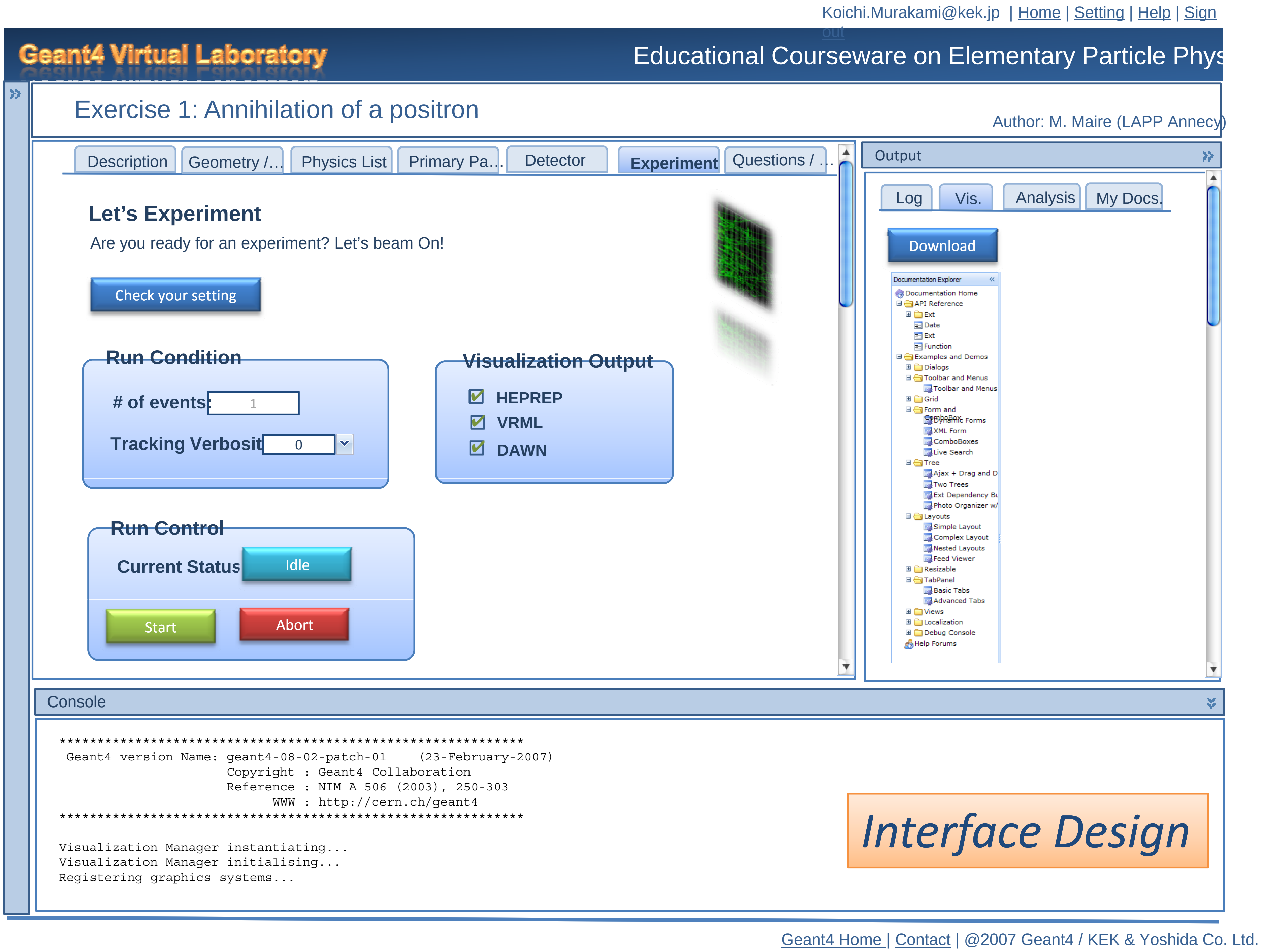
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Toolbar and Menus
Toolbar and Menus
Grid
Form and ComboBox
Dynamic Forms
XML Form
ComboBoxes
Live Search
Tree
Ajax + Drag and D
Two Trees
Ext Dependency Bu
Photo Organizer w/
Layouts
Simple Layout
Complex Layout
Nested Layouts
Feed Viewer
Resizable
TabPanel
Basic Tabs
Advanced Tabs
Views
Localization
Debug Console
Help Forums
Check your setting
Start
Abort
Console

Exercise 1: Annihilation of a positron

Author: M. Maire (LAPP Annecy)

Let's Experiment

Are you ready for an experiment? Let's beam On!

Run Condition

# of events 1

Tracking Verbosit 0

Visualization Output

☑ **HEPREP**

☑ **VRML**

☑ **DAWN**

Run Control

Current Status Idle

```
*************************************************************
 Geant4 version Name: geant4-08-02-patch-01    (23-February-2007)
                      Copyright : Geant4 Collaboration
                      Reference : NIM A 506 (2003), 250-303
                            WWW : http://cern.ch/geant4
*************************************************************

Visualization Manager instantiating...
Visualization Manager initialising...
Registering graphics systems...
```

Interface Design

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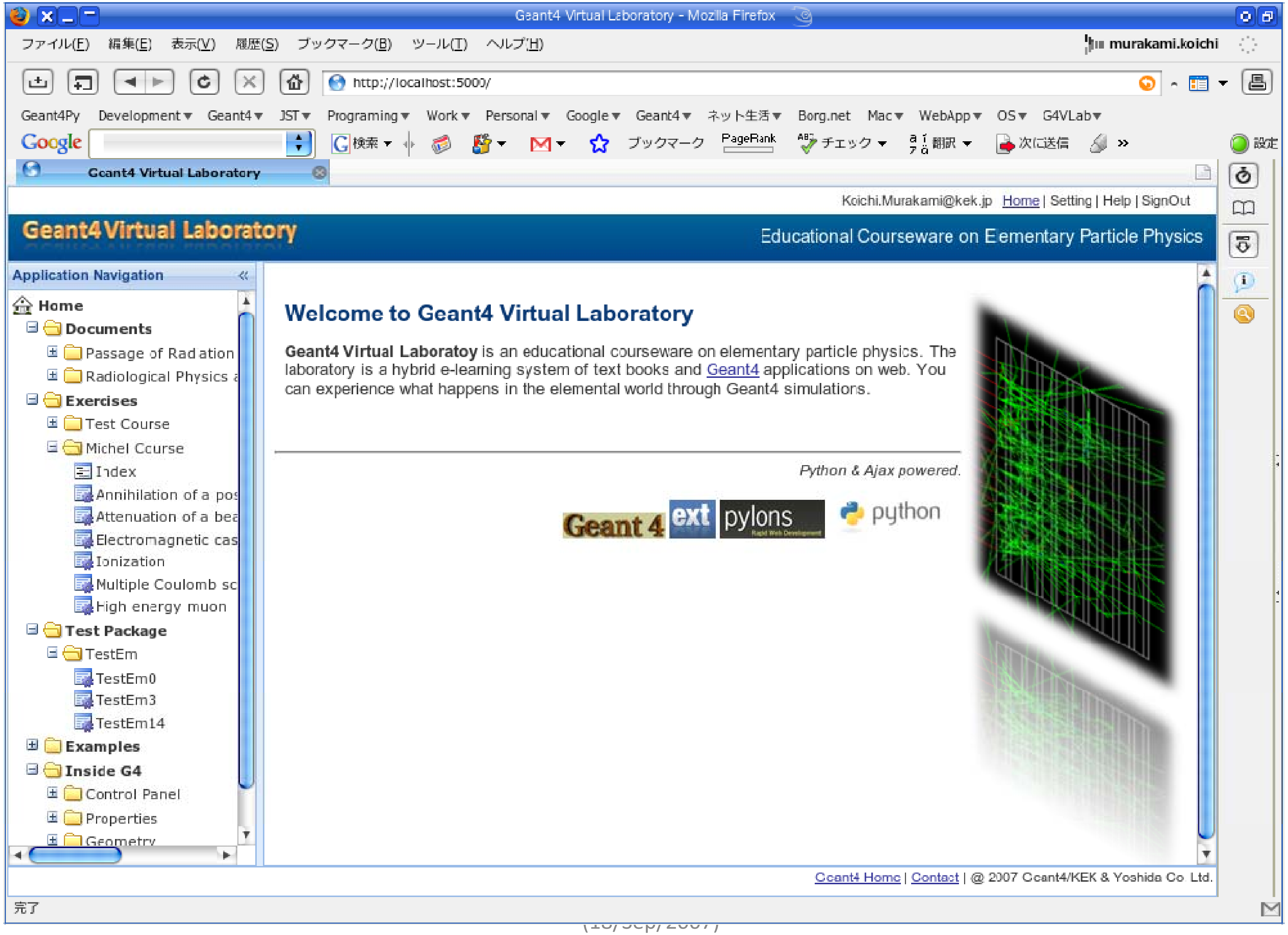

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High energy muon
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TestEm3
TestEm14
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Control Panel
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Geant 4
ext
pylons
python
完了

Welcome to Geant4 Virtual Laboratory

Geant4 Virtual Laboratoy is an educational courseware on elementary particle physics. The laboratory is a hybrid e-learning system of text books and Geant4 applications on web. You can experience what happens in the elemental world through Geant4 simulations.

Python & Ajax powered.

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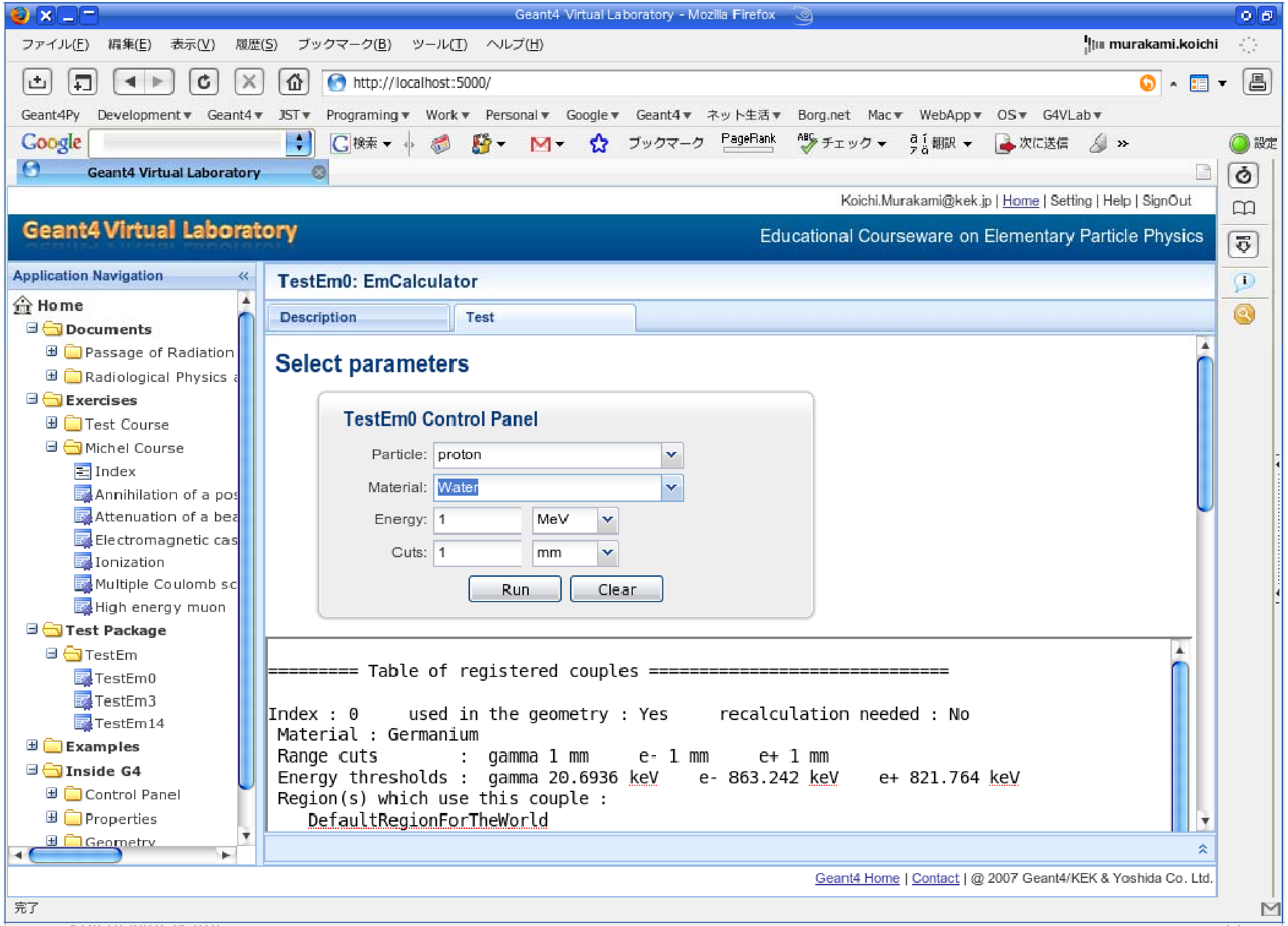
(18/Sep/2007)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完了

TestEm0: EmCalculator

Select parameters

TestEm0 Control Panel

Particle: proton
Material: Water
Energy: 1 MeV
Cuts: 1 mm

```
========= Table of registered couples ==============================

Index : 0     used in the geometry : Yes     recalculation needed : No
 Material : Germanium
 Range cuts        :  gamma 1 mm     e- 1 mm      e+ 1 mm
 Energy thresholds :  gamma 20.6936 keV    e- 863.242 keV    e+ 821.764 keV
 Region(s) which use this couple :
    DefaultRegionForTheWorld
```

(18/Sep/2007)

Introduction of ESA's on-going deployment of Web services

- After the precedent two presentation, Fang introduced ESA's Web-based services, in particular, Mulassis
  - Well defined Geant4 application for specific user groups
  - User interface on the browser are tuned for that purpose
  - Use of PHP-based server side scripting
  - User interface on a browser is used to create a macro file,
    - executed on the server for a short job
    - downloaded and executed in local machine for production
    - Pre-build applications are distributed

Discussions

- Interest in providing Geant4 examples as Web applications
- Questions about the work required to convert the existing Geant4 application into a Web application
  - In case of Mulassis, there are automatic tools for exposing messenger commands to php.
  - In case of Geant4Py, wrapping out existing applications is hand-made, but an easy job.
  - Design/Implementation of client side (Control Panel) is a main task in both cases