FLUKA GUI Status

FLUKA Meeting
Vasilis.Vlachoudis@cern.ch
CERN, 10/7/2006

Why is UI design important

- User Interfaces are what allows end users to interact with an application.
- A good UI will make an application intuitive and easy to use
- Excellent applications without good UI will be less popular than inferior ones with a good UI

What makes a good UI?

General:

- Simple
- Intuitive
- Respects the commonly accepted conventions
- Visually organized
- Native look
- Easily install and setup
- Extensible / Programmable

FLUKA:

- Do not hide the inner functionality
- Provide a platform for working/analyzing results

Language Choice

	Python	Java	Root/cint	C/C++
Distribution	Fedora: Pre-Installed M$ Win: installer, cygwin	Linux: package M$ Win: Installer, no-gygwin	Linux: package M$ Win: procedure no-cygwin	Linux: Pre-installed M$ Win: cygwin, djgpp
Flavors	Single	Several	Single	Many
Interpreted	√	√ VM	√	
Compiled		√ VM	√	√
Source Portability	√	√	√	
Binary Portability	√	√		
Interactive	√		√	

What is Python?

Python is a scripting language which is:

- interpreted
- interactive
- object-oriented
- like pseudo code
- dynamically typed
- available for many platforms
- extensible with C-API

Free from: http://www.python.org

Competing GUI toolkits for Python

1st Choice

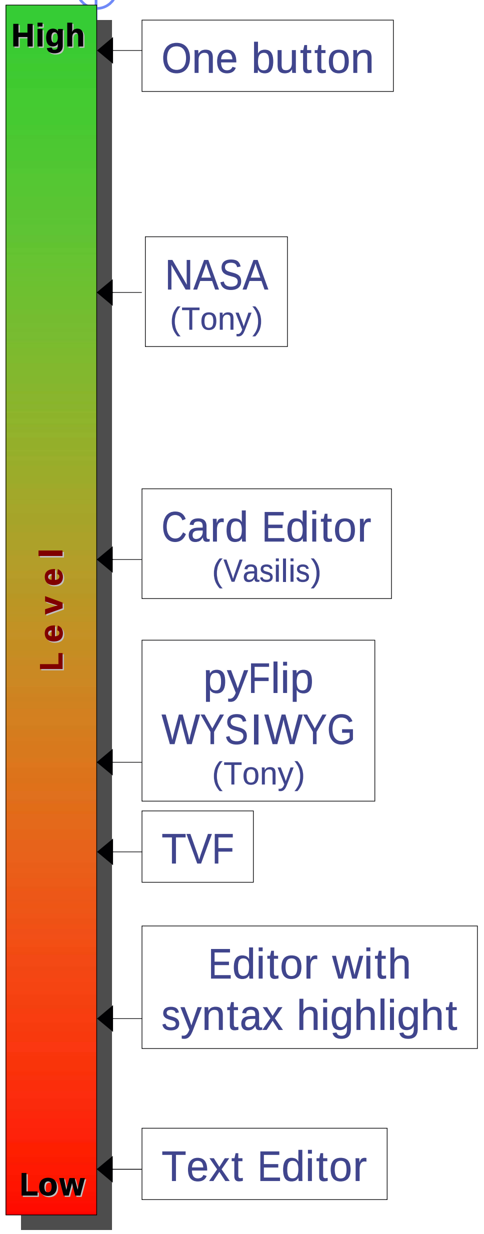
Tkinter	default GUI toolkit for Python. Good for simple UIs. Portable, wrapper around tk/tcl
wxPython	Most popular. Good for complex UIs. Wrapper on Win32, GTK
JPython	Access to the Swing library
PyGTK	Access to the well-known GTK toolkit
PyQt	Access to the well-known Qt library
win32all	Access to MFC from python (MS-Win only)
WPY	MFC style, both also available for UNIX
X11	Limited to X Windows.

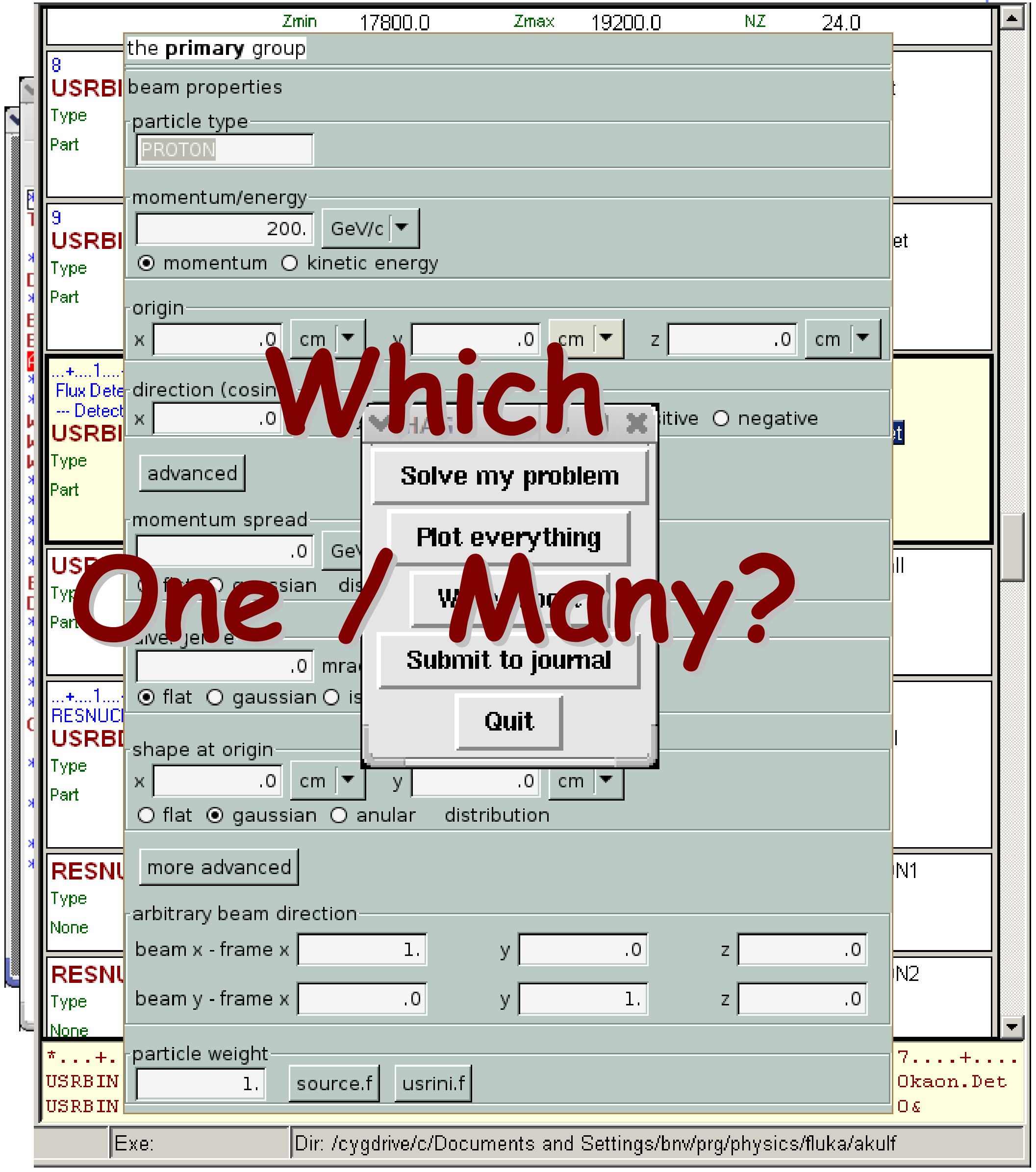
2nd

Plotting Engine

matplotlib	python 2D plotting library http://matplotlib.sourceforge.net
gnuplot-py	Python interface to gnuplot http://gnuplot-py.sourceforge.net
pyROOT	Python interface to ROOT

Front-end UI – Input file editing





Zmin 17800.0 Zmax 19200.0 NZ 24.0

the **primary** group

beam properties

particle type: PROTON

momentum/energy: 200. GeV/c [✓ momentum] kinetic energy

origin: x .0 cm y .0 cm z .0 cm

direction (cosin… x .0 …itive negative

momentum spread: .0 GeV… flat gaussian dis…

divergence: .0 mrad [✓ flat] gaussian is…

shape at origin: x .0 cm y .0 cm; flat [✓ gaussian] anular distribution

arbitrary beam direction

beam x - frame x 1. y .0 z .0

beam y - frame x .0 y 1. z .0

particle weight: 1.

Exe: Dir: /cygdrive/c/Documents and Settings/bnv/prg/physics/fluka/akulf

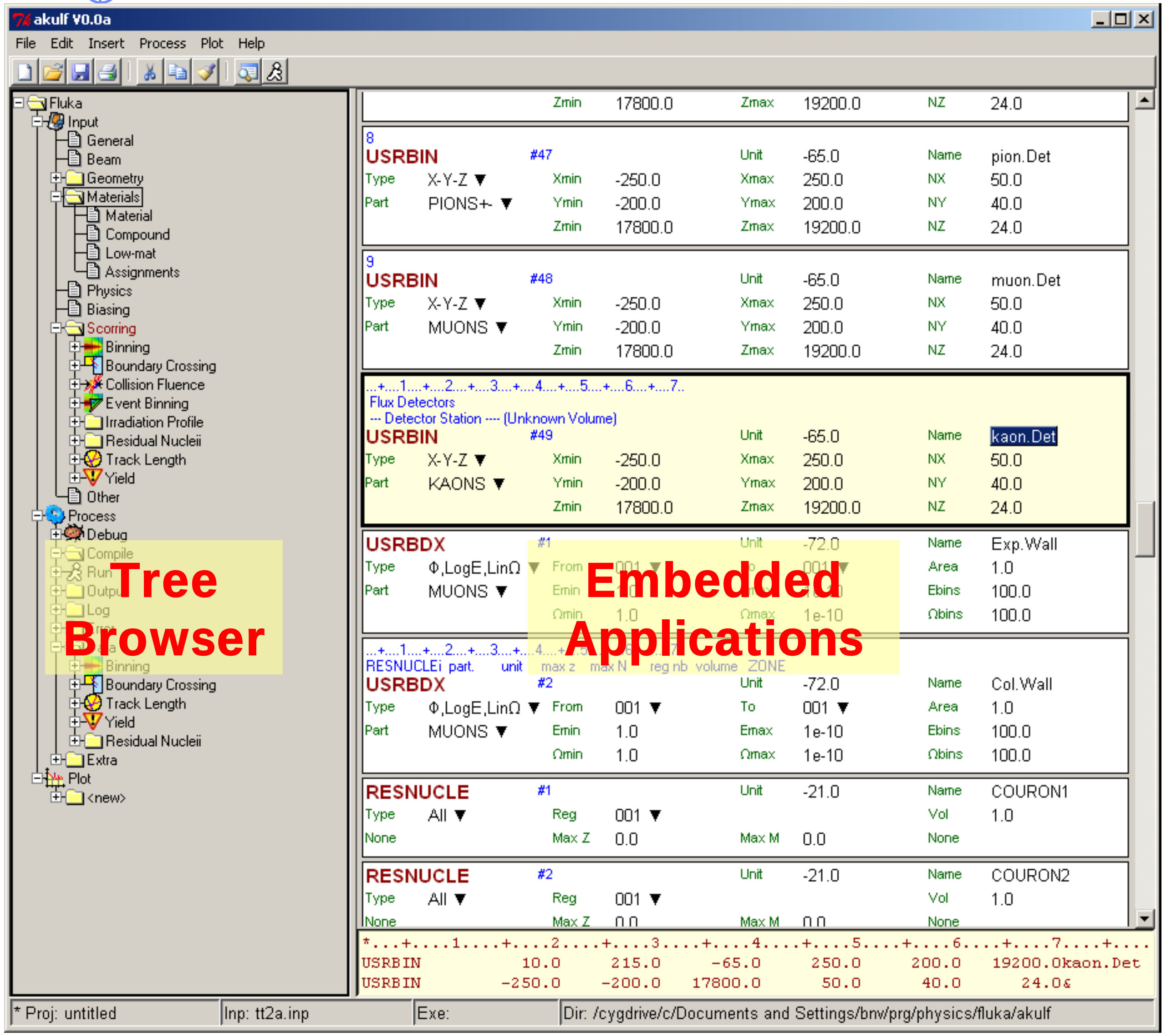
FLUKA Studio?

All-in-one: FLUKA project concept

- Front-end
  - Input file creation / editing
  - Compilation of executable
  - Debugging
  - Run and progress monitoring
- Back-end
  - Browsing of output files
  - Processing of scoring files
  - Plots creation

Possibility to go through all steps with one button

FLUKA Studio



```
          Zmin   17800.0    Zmax   19200.0    NZ    24.0

8
USRBIN        #47           Unit   -65.0      Name  pion.Det
Type  X-Y-Z ▼   Xmin  -250.0    Xmax   250.0      NX    50.0
Part  PIONS+- ▼ Ymin  -200.0    Ymax   200.0      NY    40.0
                Zmin  17800.0   Zmax   19200.0    NZ    24.0

9
USRBIN        #48           Unit   -65.0      Name  muon.Det
Type  X-Y-Z ▼   Xmin  -250.0    Xmax   250.0      NX    50.0
Part  MUONS ▼   Ymin  -200.0    Ymax   200.0      NY    40.0
                Zmin  17800.0   Zmax   19200.0    NZ    24.0

...+....1....+....2....+....3....+....4....+....5....+....6....+....7..
Flux Detectors
--- Detector Station ---- (Unknown Volume)
USRBIN        #49           Unit   -65.0      Name  kaon.Det
Type  X-Y-Z ▼   Xmin  -250.0    Xmax   250.0      NX    50.0
Part  KAONS ▼   Ymin  -200.0    Ymax   200.0      NY    40.0
                Zmin  17800.0   Zmax   19200.0    NZ    24.0

USRBDX        #1            Unit   -72.0      Name  Exp.Wall
Type  Φ,LogE,LinΩ ▼ From 001 ▼  To 001 ▼      Area  1.0
Part  MUONS ▼   Emin  1.0       Emax   1e-10      Ebins 100.0
                Ωmin  1.0       Ωmax   1e-10      Ωbins 100.0

...+....1....+....2....+....3....+....4....+....
RESNUCLEi part.  unit  max z  max N  reg nb  volume  ZONE
USRBDX        #2            Unit   -72.0      Name  Col.Wall
Type  Φ,LogE,LinΩ ▼ From 001 ▼  To 001 ▼      Area  1.0
Part  MUONS ▼   Emin  1.0       Emax   1e-10      Ebins 100.0
                Ωmin  1.0       Ωmax   1e-10      Ωbins 100.0

RESNUCLE      #1            Unit   -21.0      Name  COURON1
Type  All ▼     Reg   001 ▼                       Vol   1.0
None            Max Z 0.0       Max M  0.0        None

RESNUCLE      #2            Unit   -21.0      Name  COURON2
Type  All ▼     Reg   001 ▼                       Vol   1.0
None            Max Z 0.0       Max M  0.0        None

*...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+...
USRBIN          10.0     215.0     -65.0     250.0     200.0   19200.0kaon.Det
USRBIN        -250.0    -200.0   17800.0      50.0      40.0      24.0&

* Proj: untitled   Inp: tt2a.inp   Exe:   Dir: /cygdrive/c/Documents and Settings/bnv/prg/physics/fluka/akulf
```

- Wrapper of standalone applications
- Tree browser to select application
- Allow different ways of viewing the same object
- Input:
  - Filtering Cards
  - Show card links
  - Units: i.e. 20 GeV/c
  - Data validation
  - Import/Export on various formats
- Process:
  - Run monitoring
  - Debugging
  - Sum up files
- Plotting:
  - Interface to plot packages
- Python Libraries:
  - Input file manipulation
  - Processing
  - Plotting

Conclusions

- UI is important
- Language Choice: Python
  - Portable
  - Interpreted and Interactive
  - Mature
- GUI toolkit:

  1st choice: Tkinter

  2nd choice: pyGTK
- Plotting engine: ?
- FLUKA Studio: Wrapper of standalone applications
  - Project concept: contains everything
  - Input file editing
  - Run control
  - Post processing
  - Plot generation