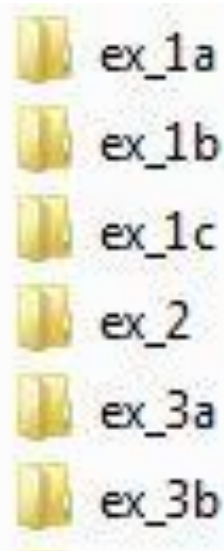


RUNNIG FLUKA EXAMPLES AND EXERCISES

In practice

Either in the CD provided here or in Alghero's machines, under `/usr/local/flukacourse` you find:



Copy these directories to your machine (even the virtual one)

Start your virtual machine (if you need it)



Call Flair (you can do it also from a terminal window)

The screenshot displays the Flair software interface. The window title is "[untitled] - flair". The menu bar includes "File", "Edit", "Card", "Input", "View", "Tools", and "Help". The toolbar contains various icons for file operations and simulation. On the left, a tree view shows the project structure under "Fluka", including folders like "Input", "Process", "Plot", and "Database". The "Process" folder is expanded, showing "Compile", "Debug", "Run", "Files", and "Data". The "Input" folder is also expanded, showing "General", "Primary", "Geometry", "Media", "Physics", "Transport", "Biasing", "Scoring", and "Flair". The "Flair" folder is highlighted with a green arrow. The main panel displays "Fluka Project Information" with fields for "Project: *Untitled*", "Directory: /home/flupix", "Title:", "Input:", "Executable:", "Geometry:", and "Geom. Output:". The "Notes" section is empty. The status bar at the bottom shows "Inp:", "Exe:", and "Dir: /home/flupix". The system tray at the bottom right shows the time as 10:23.

Open a "project"

The screenshot displays the FLAIR software interface. The main window is titled "[untitled] - flair" and features a menu bar with "File", "Edit", "Card", "Input", "View", "Tools", and "Help". A red arrow points to the "File" menu. The left sidebar shows a project tree for "Fluka" with various sub-items like "Input", "General", "Primary", "Geometry", "Media", "Physics", "Transport", "Biasing", "Scoring", "Flair", "Preprocessor", "Process", "Compile", "Debug", "Run", "Files", "Data", "Plot", "Database", "Material", and "Elements".

The "Open flair project" dialog box is open, showing the following information:

- Project: *Untitled*
- Directory: / home flupix Alghero2012 ex_3
- Title: ex_3
- Input: ex_3.flair
- Geometry: ex_3.flair
- Notes: (empty)

| Name | Type | Size | Date |
|------------|---------------|------|------------------|
| ex_3.flair | FLAIR project | 302 | 2012.05.30 10:18 |

The dialog box also includes a "File name:" field, a "Files of type:" dropdown set to "Flair Project files (*.flair)", and "Open" and "Cancel" buttons.

The status bar at the bottom shows "Inp:", "Exe:", and "Dir: /home/flupix". The taskbar at the bottom includes icons for "flair: Output", "[untitled] - flair", and "Open flair project". The system clock shows "10:24".

You can inspect/edit the input file

The screenshot shows the FLUKA input editor interface. The left sidebar has the 'Input' folder selected. The main window displays the input file content, which includes sections for beam characteristics, geometry, and target definitions. A red box highlights the 'PRECISIO' dropdown menu in the 'DEFAULTS' section, with a red arrow pointing to it from the text 'Notice the default setup'.

Notice the default setup

```
TITLE      ex_1c + hollow cylinder scoring implentation
Set the defaults for precision simulations
...+...1...+...2...+...3...+...4...+...5...+...6...+...7...
DEFAULTS      PRECISIO
Define the beam characteristics
...+...1...+...2...+...3...+...4...+...5...+...6...+...7...
BEAM          Beam: Energy
              Δp: Gauss
              Δp(FWHM): 0.001175
              Shape(X): Gauss
              x(FWHM): 4.71
              E: 0.1
              Δφ: Flat
              Shape(Y): Gauss
              Part: PROTON
              Δφ:
              y(FWHM): 4.71
Define the beam position
...+...1...+...2...+...3...+...4...+...5...+...6...+...7...
BEAMPOS      x:
              cosx:
              y:
              cosy:
              z:
              Type: POSITIVE
Define the Geometry of the problem
GEOBEGIN     Log:
              Inp: 27
              Acc:
              Out:
              Opt:
              Fmt: COMBNAME
Black body
SPH          blkbody
              x: 0.0
              R: 100000.0
              y: 0.0
              z: 0.0
Void sphere
SPH          void
              x: 0.0
              R: 1000.0
              y: 0.0
              z: 0.0
Rectangular Water tank target
RPP          target
              Xmin: -20.
              Ymin: -20.
              Zmin: 60.
              Xmax: 20.
              Ymax: 20.
              Zmax: 100.
Hollow cylinder
RCC          EXTcyl
              x: 0.
              Hx: 0.
              R: 10.
              y: 0.
              Hy: 0.
              z: 20.
              Hz: 20.
RCC          INTcyl
              x: 0.
              y: 0.
              z: 20.
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
TITLE
ex_1c + hollow cylinder scoring implentation
```

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3 Card:1 Total:33

Input can be viewed in logically separated sections:

Primary properties

The screenshot displays the FLAIR software interface for a file named 'ex_3.flair - flair'. The left sidebar shows a tree view of the input sections, with 'Primary' highlighted and indicated by a red arrow. The main window displays the configuration for the 'Primary' section, which is divided into several logical sections:

- Define the beam characteristics**:
 - BEAM: Beam: Energy, E: 0.1, Part: PROTON
 - Δp: Gauss, Δp(FWHM): 0.001175, Δφ: Flat
 - Shape(X): Gauss, x(FWHM): 4.71, Shape(Y): Gauss, y(FWHM): 4.71
- Define the beam position**:
 - BEAMPOS: x, y, z, Type: POSITIVE
- Set the number of primary histories to be simulated in the run**:
 - START: No.: 10000, Report: default

The status bar at the bottom indicates: Inp: ex_3.inp, Exe: /home/flupix/Alghero2012/ex_3, Card:1-2 Displayed:3 Total:33.

Geometry description

The screenshot shows the FLUKA geometry description editor interface. The left pane displays a hierarchical tree view of the project structure, with the 'Geometry' folder highlighted by a red arrow. The right pane shows the geometry description code, starting with 'GEOBEGIN' and ending with 'END'. The code defines several regions and volumes, including a black body, a void sphere, a rectangular water tank target, and hollow cylinders.

Tree View Structure:

- Fluka
 - Input
 - General
 - Primary
 - Beam
 - Beampos
 - Start
 - Geometry**
 - Geobegin
 - Bodies
 - Region
 - Geoend
 - Media
 - Physics
 - Transport
 - Biasing
 - Scoring
 - Flair
 - Preprocessor
 - Process
 - Compile
 - Debug
 - Run
 - Files
 - Data
 - Plot
 - Database
 - Material
 - Elements

Geometry Description Code:

```
TITLE ... BEAMPOS : 4 cards hidden
-----
Define the Geometry of the problem
GEOBEGIN
  Log:          Inp: 27          Acc:          Opt:
  Out:          Fmt: COMBNAME
  Title: water target + lead collimator
  Black body
  SPH   blkbody      x: 0.0      y: 0.0      z: 0.0
                R: 100000.0
  Void sphere
  SPH   void         x: 0.0      y: 0.0      z: 0.0
                R: 1000.0
  Rectangular Water tank target
  RPP   target      Xmin: -20.  Xmax: 20.
                Ymin: -20.  Ymax: 20.
                Zmin: 60.   Zmax: 100.
  Hollow cylinder
  RCC   EXTcyl      x: 0.      y: 0.      z: 20.
                Hx: 0.     Hy: 0.     Hz: 20.
                R: 10.
  RCC   INTcyl      x: 0.      y: 0.      z: 20.
                Hx: 0.     Hy: 0.     Hz: 20.
                R: 1.
  END
  Black hole
  REGION BLKBODY      Neigh: 5      Volume:
  expr: +blkbody -void
  Void around
  REGION VOID         Neigh: 5      Volume:
  expr: +void -target -(+EXTcyl -INTcyl)
  Target
  REGION PHANTOM     Neigh: 5      Volume:
  expr: +target
```


Media properties

The screenshot displays the FLUKA GUI interface for a simulation named 'ex_3.flair - flair'. The left sidebar shows a tree view of the simulation components, with the 'Media' folder under 'Flair' selected and highlighted by a red arrow. The main window shows the properties for the selected material, '276 Water liquid H2_O', with the chemical formula $H - O - H$.

The properties are organized into several sections:

- MATERIAL**: Name: WATER, # p: 1.0, Am: A, dE/dx: ▼
- COMPOUND**: Name: WATER ▼, Mix: Atom ▼, Elements: 1..3 ▼, M1: HYDROGEN ▼, f2: 1.0, M2: OXYGEN ▼, f3: ▼
- MAT-PROP**: Type: ▼, Gas pressure: RHOR: Step: to Mat: ▼
- ASSIGNMA**: Mat: BLCKHOLE ▼, Reg: BLKBODY ▼, to Reg: ▼, Mat(Decay): ▼, Step: Field: ▼
- ASSIGNMA**: Mat: AIR ▼, Reg: VOID ▼, to Reg: ▼, Mat(Decay): ▼, Step: Field: ▼
- ASSIGNMA**: Mat: WATER ▼, Reg: PHANTOM ▼, to Reg: ▼, Mat(Decay): ▼, Step: Field: ▼
- ASSIGNMA**: Mat: LEAD ▼, Reg: COLL ▼, to Reg: ▼, Mat(Decay): ▼, Step: Field: ▼

The status bar at the bottom indicates: Inp: ex_3.inp, Exe: Dir: /home/flupix/Alghero2012/ex_3, Card:1-17 Displayed:7 Total:33.

Setting of transport

The screenshot displays the FLAIR software interface. On the left, a tree view shows the project structure under 'Fluka', with 'Transport' highlighted under the 'Physics' folder. A red arrow points to this 'Transport' folder. The main window shows the configuration for 'EMFCUT' (Type: PROD-CUT) with the following settings:

- Type: PROD-CUT
- e-e+ Threshold: Kinetic
- e-e+ Ekin: 0.1
- γ: 0.1
- Fudgem: Mat: BLCKHOLE
- to Mat: LEAD
- Step:

Below this, another 'EMFCUT' entry is shown with the following settings:

- Type:
- e-e+ Threshold: Kinetic
- e-e+ Ekin: 0.1
- γ: 0.1
- Old brems.: off
- Bremsstrahlung: off
- Pair Prod.: off
- e+ ann @rest: off
- Compton: off
- Bhabha&Moller: off
- Photo-electric: off
- e+ ann @flight: off
- Reg: VOID
- to Reg: COLL
- Step:

At the bottom of the window, the status bar indicates: 'Inp: ex_3.inp', 'Exe:', 'Dir: /home/flupix/Alghero2012/ex_3', and 'Card:1-24 Displayed:2 Total:33'.

Here, as an example, only energy cuts for production and transport of e^+e^- , γ are tweaked

Choosing the scoring options

The screenshot shows the FLUKA GUI interface. On the left, a tree view displays the project structure. A red arrow points to the 'Scoring' folder under the 'Physics' section. The main window displays the 'SCORE' card configuration, including three 'USRBIN' cards and a 'RANDOMIZ' card. The status bar at the bottom indicates 'Card:1-26 Displayed:4 Total:33'.

FLUKA Project Structure (Left Panel):

- Fluka
 - Input
 - General
 - Primary
 - Beam
 - Beampos
 - Start
 - Geometry
 - Geobegin
 - Bodies
 - Region
 - Geoend
 - Media
 - Material
 - Compound
 - Mat-Prop
 - Assignmat
 - Physics
 - Transport
 - Biasing
 - Scoring**
 - Usrbin
 - Score
 - Flair
 - Preprocessor
 - Process
 - Compile
 - Debug
 - Run
 - Files
 - Data
 - Plot
 - Database
 - Material

SCORE Card Configuration (Main Panel):

TITLE ... EMFCUT : 26 cards hidden

SCORE Part1: ENERGY Part2: DOSE Part3: EM-ENRGY Part4: DOSE-EM

Scoring
...+...1...+...2...+...3...+...4...+...5...+...6...+...7...

USRBIN Unit: 34 BIN Name: **Voxel**

| | | | |
|--------------|------------|-----------|---------|
| Type: X-Y-Z | Xmin: -2.5 | Xmax: 2.5 | NX: 10. |
| Part: ENERGY | Ymin: -2.5 | Ymax: 2.5 | NY: 10. |
| | Zmin: 60. | Zmax: 65. | NZ: 10. |

USRBIN Unit: 35 BIN Name: **Slice**

| | | | |
|--------------|------------|-----------|-----------|
| Type: X-Y-Z | Xmin: -2.5 | Xmax: 2.5 | NX: 1. |
| Part: ENERGY | Ymin: -2.5 | Ymax: 2.5 | NY: 1. |
| | Zmin: 60. | Zmax: 70. | NZ: 1000. |

USRBIN Unit: 36 BIN Name: **EnPhant**

| | | | |
|--------------|------------|------------|---------|
| Type: X-Y-Z | Xmin: -20. | Xmax: 20. | NX: 80. |
| Part: ENERGY | Ymin: -20. | Ymax: 20. | NY: 80. |
| | Zmin: 60. | Zmax: 100. | NZ: 80. |

RANDOMIZ ... STOP : 3 cards hidden

Stat: Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3 Card:1-26 Displayed:4 Total:33

Click on a card to select and edit it

The screenshot shows the FLUKA GUI window titled "ex_3.flair - flair". The interface includes a menu bar (File, Edit, Card, Input, View, Tools, Help), a toolbar, and a tree view on the left. The tree view shows the project structure, with "Scoring" selected. The main window displays the "SCORE" section, which is titled "TITLE ... EMFCUT : 26 cards hidden". Below this, there are three "USRBIN" cards. A red arrow points to the first "USRBIN" card, which is highlighted in yellow. The second "USRBIN" card is also highlighted in yellow. The third "USRBIN" card is not highlighted. The status bar at the bottom shows "Inp: ex_3.inp", "Exe:", "Dir: /home/flupix/Alghero2012/ex_3", and "Card:28 Displayed:4 Total:33".

----- TITLE ... EMFCUT : 26 cards hidden -----

Part1: ENERGY ▼ Part2: DOSE ▼
Part3: EM-ENERGY ▼ Part4: DOSE-EM ▼

Scoring
+...1...+...2...+...3...+...4...+...5...+...6...+...7...

USRBIN Unit: 34 BIN ▼ Name: Voxel
Type: X-Y-Z ▼ Xmin: -2.5 Xmax: 2.5 NX: 10.
Part: ENERGY ▼ Ymin: -2.5 Ymax: 2.5 NY: 10.
Zmin: 60. Zmax: 65. NZ: 10.

USRBIN Unit: 35 BIN ▼ Name: Slice
Type: X-Y-Z ▼ Xmin: -2.5 Xmax: 2.5 NX: 1.
Part: ENERGY ▼ Ymin: -2.5 Ymax: 2.5 NY: 1.
Zmin: 60. Zmax: 70. NZ: 1000.

USRBIN Unit: 36 BIN ▼ Name: EnPhant
Type: X-Y-Z ▼ Xmin: -20. Xmax: 20. NX: 80.
Part: ENERGY ▼ Ymin: -20. Ymax: 20. NY: 80.
Zmin: 60. Zmax: 100. NZ: 80.

----- RANDOMIZ ... STOP : 3 cards hidden -----

*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
USRBIN 10. ENERGY -34. 2.5 2.5 65. Voxel
USRBIN -2.5 -2.5 60. 10. 10. 10. &

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3 Card:28 Displayed:4 Total:33

By pressing F1 you get the manual entry for that card

The screenshot shows a software interface with a file tree on the left and a manual page on the right. The file tree is titled 'Fluka' and contains several folders: 'Input', 'General', 'Primary', 'Geometry', 'Media', 'Physics', 'Transport', 'Biasing', 'Scoring', 'Flair', and 'Preprocessor'. The 'Input' folder is expanded, showing a list of cards: USRCOLL, USRGCALL, USRICALL, USROCALL, USRTRACK, USRYIELD, WW-FACTOR, WW-PROFILE, WW-THRESH, 8} Combinatorial Geometry, 8.1} GEOBEGIN card, 8.2} Geometry Title card, and 8.3} Body data. The 'USRBIN' card is highlighted in the list. The manual page is titled 'flair manual' and shows the entry for 'USRBIN'. The entry includes a description of the card's function, a list of related cards, and a detailed list of properties and scoring methods.

Macchina Visualizza Dispositivi Aiuto

flair manual

USRBIN

scores distribution of one of several quantities in a regular spatial structure (binning detector) independent from the geometry.

See also [SCORE](#) (scoring by region), [EVENTBIN](#) (event-by-event scoring) and [USRBDX](#), [USRCOLL](#), [USRTRACK](#), [USRYIELD](#) (fluence estimators)

The full definition of the detector may require two successive cards. The second card, identified by the character '&' in any column from 71 to 78 (or in the last field in case of free format input), must be given unless the corresponding defaults are acceptable to the user)

First card:

WHAT(1) : code indicating the type of binning selected. Each type is characterised by a number of properties:

- * structure of the mesh (spatial: R-Z, R-Phi-Z, Cartesian, or special - by region, or user-defined)
- * quantity scored:
 - energy deposited (total or electromagnetic only)
 - dose (total or electromagnetic only)
 - stars
 - fissions (total, high energy or low energy)
 - neutron balance
 - activity
 - specific activity
 - displacements per atom
 - non ionising energy losses (restricted or unrestricted)
 - dose equivalent: convoluting fluence with conversion coefficients or multiplying dose by a LET-dependent quality factor
 - momentum transfer
 - net charge
 - fluence (track-length density)
 - silicon 1 MeV-equivalent neutron flux
 - hadrons with energy > 20 MeV
- * method used for scoring (old algorithm where the energy lost in a step by a charged particle is deposited in the middle of the step, or new algorithm where the energy lost

Inp: ex_3.inp

flair: Output

ex_3.flair - flair

flair manual

15:58

The Compilation Window

The screenshot shows the FLUKA GUI interface. The main window is titled "ex_3.flair - flair". The menu bar includes "File", "Edit", "Card", "Input", "View", "Tools", and "Help". The toolbar contains various icons for file operations and simulation control.

The left sidebar shows a tree view of the project structure. The "Process" node is highlighted with a red arrow. The "Compile" node under "Process" is also highlighted with a red arrow.

The main window displays the "Compile Executable" dialog. It features a table with the following columns: "File", "Type", "Size", and "Date". The table is currently empty.

Below the table, there are fields for "Link: lfuka", "Exe:", and "Default main:". The "Options:" field is empty. There are checkboxes for "D Line" and "Bound Check".

At the bottom of the dialog, there are three buttons: "Build" (highlighted with a yellow background), "Compile", and "Clean".

The status bar at the bottom shows "Inp: ex_3.inp", "Exe:", and "Dir: /home/flupix/Alghero2012/ex_3".

Starting and managing the run

The screenshot shows the FLUKA GUI window titled "ex_3.flair - flair". The interface includes a menu bar (File, Edit, Card, Input, View, Tools, Help) and a toolbar. On the left is a tree view of the simulation setup, with a red arrow pointing to the "Run" button under the "Process" folder. The main area is the "Run Fluka" dialog, which is currently empty. Below the dialog are controls for "Cycles" (Continue, Previous 0, No. Cycles 5, Last 5) and a row of buttons: Run, Stop Cycle, Stop Run, Kill, Attach, Refresh, and Queue *Default. At the bottom, a "Progress" section shows "Status: Not Running" and "Input: ex_3". The status bar at the very bottom displays "Inp: ex_3.inp", "Exe:", "Dir: /home/flupix/Alghero2012/ex_3", and "Running 0 out of 1".

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ex_3.flair - flair

File Edit Card Input View Tools Help

Fluka

- Input
 - General
 - Primary
 - Beam
 - Beampos
 - Start
 - Geometry
 - Geobegin
 - Bodies
 - Region
 - Geoend
 - Media
 - Material
 - Compound
 - Mat-Prop
 - Assignmat
 - Physics
 - Transport
 - Emfcut
 - Biasing
 - Scoring
 - Usrbin
 - Score
 - Flair
 - Preprocessor
 - Process
 - Compile
 - Debug
 - Run**
 - Files
 - Data
 - Plot
 - Database

Run Fluka

Run / Input
<ex_3>

Override Options

Title: ex_1c + hollow cylinder scoring implementation

Primaries: 0 Rnd: 0

Time: 0 Exe:

Defines: Default Defines

| Sel | Name | Value |
|-----|------|-------|
|-----|------|-------|

Cycles: Continue Previous 0 No. Cycles 5 Last 5

Run Stop Cycle Stop Run Kill Attach Refresh Queue *Default

Progress

Status: Not Running Input: ex_3 Dir:

Started: ETA: Time/prim:

Elapsed: Cycle: Run:

Cycles:

Primaries:

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3 Running 0 out of 1

flair: Output ex_3.flair - flair 10:32

Checking the run online

The screenshot shows the FLUKA graphical user interface (GUI) with the following components:

- Menu Bar:** File, Edit, Card, Input, View, Tools, Help
- Toolbar:** Standard GUI icons for file operations and simulation control.
- Left Panel (Tree View):** Hierarchical structure of the simulation setup, including Input, General, Primary, Beam, Beampos, Start, Geometry, Bodies, Region, Geoend, Media, Material, Compound, Mat-Prop, Assignmat, Physics, Transport, Emfcut, Biasing, Scoring, Usrbin, Score, Flair, Preprocessor, Process, Compile, Debug, Run, Files, Data, Plot, and Database.
- Right Panel (Run Fluka):**
 - Run / Input:** <ex_3>
 - Override Options:** Title: ex_1c + hollow cylinder scoring implementation; Primaries: 0; Rnd: 0; Time: 0; Exe: [empty]; Defines: Default Defines.
 - Table:** A table with columns 'Sel', 'Name', and 'Value'.
 - Control Panel:** Cycles: Continue, Previous 0, No. Cycles 5, Last 5; Buttons: Run, Stop Cycle, Stop Run, Kill, Attach, Refresh, Queue *Default.
 - Progress:** Status: Running; Input: ex_3; Dir: fluka_1915; Started: 2012.05.30 10:32; ETA: 2012.05.30 10:32; Time/prim: 0.361039 ms; Elapsed: 2.31065 s; Cycle: 1.29974 s; Run: 12.1309 s; Cycles: Current: 2 [0 - 5] Done: 1 out of 5 (20%); Primaries: Current: 6401 [0 - 10000] Done: 6400 out of 10000 (64%).
 - Status Bar:** Inp: ex_3.inp; Exe: [empty]; Dir: /home/flupix/Alghero2012/ex_3; Running 1 out of 1.

Annotation: A red box highlights the 'Refresh' button in the control panel. A red arrow points from the box to the button. A text box next to the arrow contains the text: "If needed to update faster than the automatic refresh time".

Inspecting output files

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+ ex_3.flair - flair

File Edit Card Input View Tools Help

Fluka

- Input
 - General
 - Primary
 - Geometry
 - Media
 - Physics
 - Transport
 - Biasing
 - Scoring
 - Flair
 - Preprocessor
- Process
 - Compile
 - Debug
 - Run
 - Files**
 - Data
- Plot
- Database
- Material
- Elements

Output Files

Run <ex_3>

Cycles 001 002

To invoke editor (for ascii files only!)

| File | Type | Size | Date |
|-----------------|-----------|---------|------------------|
| ex_3001_fort.36 | 36 | 2048238 | 2012.05.30 10:32 |
| ex_3001.err | FLUKA err | 22914 | 2012.05.30 10:32 |
| ranex_3001 | -file- | 1651 | 2012.05.30 10:32 |
| ex_3001.out | FLUKA out | 133530 | 2012.05.30 10:32 |
| ex_3001_fort.34 | 34 | 4238 | 2012.05.30 10:32 |
| ex_3001.log | FLUKA log | 9519 | 2012.05.30 10:32 |
| ex_3001_fort.35 | 35 | 4238 | 2012.05.30 10:32 |

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3 Running 0 out of 1

flair: Output + ex_3.flair - flair 10:34 Right Ctrl

Selecting scoring output for post-processing

The screenshot shows the Flair software interface. The left sidebar displays a tree view of the project structure, with the 'Data' folder highlighted by a red arrow. The main window is titled 'Data Merging' and shows a list of files and folders. The 'Run' folder contains a sub-folder '<ex_3>'. The 'Usrxxx' folder contains three files: 'ex_3_usrbin_34', 'ex_3_usrbin_35', and 'ex_3_usrbin_36'. Below this, a table lists the files and their properties:

| File | Type | Size | Date |
|-----------------|------|---------|------------------|
| ex_3001_fort.34 | 34 | 4238 | 2012.05.30 10:32 |
| ex_3001_fort.35 | 35 | 4238 | 2012.05.30 10:32 |
| ex_3001_fort.36 | 36 | 2048238 | 2012.05.30 10:32 |
| ex_3002_fort.34 | 34 | 4238 | 2012.05.30 10:32 |
| ex_3002_fort.35 | 35 | 4238 | 2012.05.30 10:32 |
| ex_3002_fort.36 | 36 | 2048238 | 2012.05.30 10:32 |
| ex_3003_fort.34 | 34 | 4238 | 2012.05.30 10:33 |
| ex_3003_fort.35 | 35 | 4238 | 2012.05.30 10:33 |
| ex_3003_fort.36 | 36 | 2048238 | 2012.05.30 10:33 |
| ex_3004_fort.34 | 34 | 4238 | 2012.05.30 10:33 |
| ex_3004_fort.35 | 35 | 4238 | 2012.05.30 10:33 |
| ex_3004_fort.36 | 36 | 2048238 | 2012.05.30 10:33 |
| ex_3005_fort.34 | 34 | 4238 | 2012.05.30 10:33 |
| ex_3005_fort.35 | 35 | 4238 | 2012.05.30 10:33 |
| ex_3005_fort.36 | 36 | 2048238 | 2012.05.30 10:33 |

A red box highlights the text 'To activate post-processing', with a red arrow pointing to the 'Process' button at the bottom right of the interface. The status bar at the bottom shows 'Inp: ex_3.inp', 'Exe:', 'Dir: /home/flupix/Alghero2012/ex_3', and 'Files: 15 Total Size: 10283570'.

Successful post-processing

The screenshot displays the FLUKA software interface. The main window is titled "+ ex_3.flair - flair". The left sidebar shows a project tree with folders like "General", "Primary", "Geometry", "Media", "Physics", "Transport", "Biasing", "Scoring", "Flair", "Preprocessor", "Process", "Compile", "Debug", "Run", "Files", "Data", "Plot", "Database", "Material", and "Elements". The "Data" folder is selected.

The "Data Merging" window is open, showing a list of files created during the process. The files are listed in a table with columns for File, Type, Size, and Date.

| File | Type | Size | Date |
|-----------------|------|---------|------------------|
| ex_3001_fort.34 | 34 | 4238 | 2012.05.30 10:32 |
| ex_3001_fort.35 | | | |
| ex_3001_fort.36 | | | |
| ex_3002_fort.34 | | | |
| ex_3002_fort.35 | | | |
| ex_3002_fort.36 | | | |
| ex_3003_fort.34 | | | |
| ex_3003_fort.35 | | | |
| ex_3003_fort.36 | | | |
| ex_3004_fort.34 | 34 | 4238 | 2012.05.30 10:33 |
| ex_3004_fort.35 | 35 | 4238 | 2012.05.30 10:33 |
| ex_3004_fort.36 | 36 | 2048238 | 2012.05.30 10:33 |
| ex_3005_fort.34 | 34 | 4238 | 2012.05.30 10:33 |
| ex_3005_fort.35 | 35 | 4238 | 2012.05.30 10:33 |
| ex_3005_fort.36 | 36 | 2048238 | 2012.05.30 10:33 |

A dialog box titled "Data Merging" is displayed in the foreground, showing the following message:

**Files created: ex_3_usrbin_34
ex_3_usrbin_35 ex_3_usrbin_36**

The dialog box has an "OK" button.

The status bar at the bottom of the window shows: Inp: ex_3.inp, Exe: , Dir: /home/flupix/Alghero2012/ex_3, Files: 15 Total Size: 10283570.

Adding/creating plots

The screenshot displays the flair software interface. On the left, a project tree shows a folder named 'Plot' under the 'Data' section, with sub-items for 'Red', 'Green', 'Blue', and 'Magenta'. A red arrow points to this 'Plot' folder. On the right, a 'Plot List' table contains the following data:

| File | Title | Type |
|---------|------------------------|----------|
| Red | GeoViewer Red plot | Geometry |
| Green | GeoViewer Green plot | Geometry |
| Blue | GeoViewer Blue plot | Geometry |
| Magenta | GeoViewer Magenta plot | Geometry |

A red arrow points to the right-hand side of the Plot List table, where a red box contains the text 'To add or delete plots'.

At the bottom of the window, the status bar shows: Inp: ex_3.inp | Exe: | Dir: /home/flupix/Alghero2012/ex_3 | 4 plots

Example: adding a plot for a USRBIN scoring

The screenshot shows the FLUKA GUI window titled '+ ex_3.flair - flair'. The 'Plot List' dialog box is open, displaying a table of plots. A red arrow points to the 'USRBIN' entry in the 'Type' column.

| File | Title | Type |
|-------------|------------------------|---------------|
| Red | GeoViewer Red plot | Geometry |
| Green | GeoViewer Green plot | Geometry |
| Blue | GeoViewer Blue plot | Geometry |
| Magenta | GeoViewer Magenta plot | Geometry |
| ex_3_plot05 | Plot #5 | Geometry |
| | | USR-1D |
| | | USR-2D |
| | | USRBIN |
| | | USERDUMP |
| | | RESNUCLE |

At the bottom of the window, the status bar shows: Inp: ex_3.inp, Exe:, Dir: /home/flupix/Alghero2012/ex_3, 5 plots.

Setting up the newly created plot

The screenshot displays the FLUKA GUI interface for configuring a plot. The main window is titled '+ ex_3.flair - flair'. The left sidebar shows a tree view of the project structure, with 'Fluka' expanded to 'Plot', where 'ex_3_plot05' is selected. The main panel shows the 'USRBIN Plot' configuration window. The 'Plot' section includes fields for 'Title: Plot #5', 'File: ex_3_plot05', and 'Display: 0'. The 'Axes Labels' section has fields for 'X', 'Y', and 'CB'. The 'Binning Detector' section has a folder icon highlighted with a red arrow. A red box with the text 'To open the result of post-processing phase' points to this icon. The 'Projection & Limits' section shows 'Z' selected. The 'Plot' button is highlighted in yellow.

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File Edit Card Input View Tools Help

Fluka

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- Material
- Elements

USRBIN Plot

Plot

Title: Plot #5 Options:

File: ex_3_plot05 .eps Display: 0 Line Type:

Axes Labels

X: Opt: Set Size / Multiplot

Y: Opt: grid aspect:

CB: Opt: legend Width: Height:

Binning Detector

File: Title:

Cycles: Primaries: Weight: Time:

Binning Info

Det: X: Min:

Type: Max:

Score: Min:

Projection & Limits

X 1

Y 1

Z 1

swap Min. Max. Use: No-

errors CPD: 3 Colors: 30 Pos:

Norm: log Palette: FLUKA Round Axes: Auto

Plot

Replot

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3

flair: Output + ex_3.flair - flair 10:37 Right Ctrl

Select the proper output sum file

The screenshot shows the FLUKA GUI with the 'Load USRBIN file' dialog box open. The dialog box displays a table of files in the directory /home/flupix/Alghero2012/ex_3. A red arrow points to the file 'ex_3_usrbin_35'. The 'File name' field at the bottom of the dialog is set to 'ex_3_usrbin_35'. The 'Files of type' dropdown is set to 'Fluka USRBIN files (*.usrbin*,*.bnn)'. The 'Open' button is visible.

| Name | Type | Size | Date |
|----------------|--------|---------|------------------|
| ex_3_usrbin_34 | -file- | 8268 | 2012.05.30 10:35 |
| ex_3_usrbin_35 | -file- | 8268 | 2012.05.30 10:35 |
| ex_3_usrbin_36 | -file- | 4096268 | 2012.05.30 10:35 |

File name: ex_3_usrbin_35

Files of type: Fluka USRBIN files (*.usrbin*,*.bnn)

Open Cancel

Geometry Use: -No- Pos: Axes: Auto

Plot Replot

Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3

Customizing the plot

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+ ex_3.flair - flair

File Edit Card Input View Tools Help

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- Database
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USRBIN Plot

Plot

Title: Plot #5 Options: _____

File: ex_3_plot05 .eps Display: 0 Line Type: _____

Axes Labels

X: _____ Opt: _____

Y: _____ Opt: _____

CB: _____ Opt: _____

Set

grid

legend

Size / Multiplot

aspect: _____

Width: _____ Height: _____

Binning Detector

File: ex_3_usrbin_35 Title: _____

Cycles: 5 Primaries: 50000 Weigh: _____

Binning Info

Det: 1 Slice

Type: 10: X-Y-Z Y: [-2.5 .. 2.5] x 1 (5) Max: _____

Score: ENERGY Z: [60 .. 70] x 1000 (0.01) Int: _____

Projection & Limits

Type: 1D Projection

X: _____ 1 _____ Get

Y: _____ 1 _____ swap

Z: _____ 1 _____ errors

Norm: _____ log

Plot

Replot

Plot

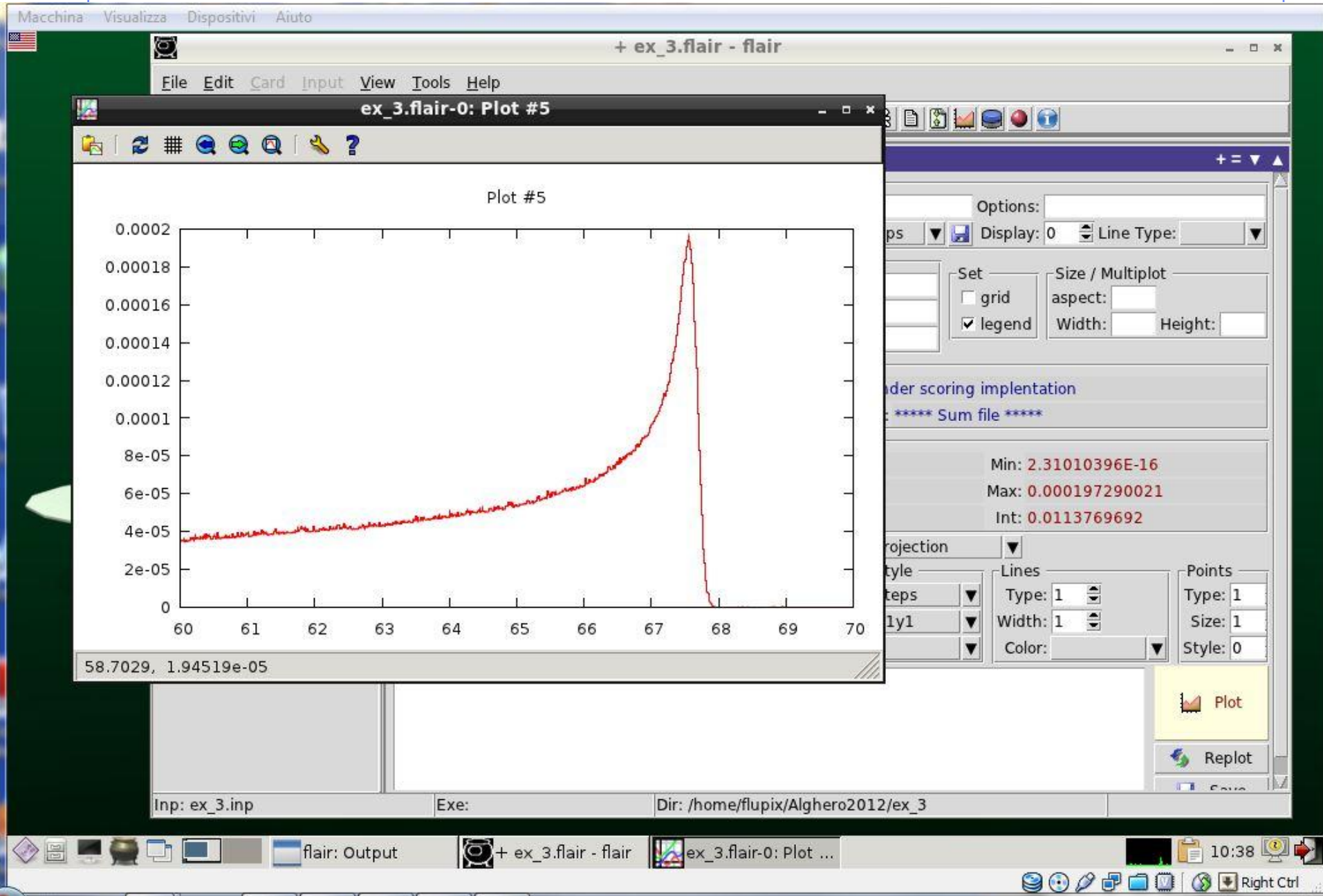
Inp: ex_3.inp Exe: Dir: /home/flupix/Alghero2012/ex_3

flair: Output + ex_3.flair - flair 10:38 Right Ctrl

In this case we need a 1-D projection

To obtain the plot

The result!



You can:

- Choose various plot options (with error bars, change color, style, markers, etc.)
- Select the range of variables
- Save graphics in different formats

In practice here we are just interfacing to gnuplot

Automatically an ascii file (*.dat) is created, to allow easy input to other graphical packages that you might prefer

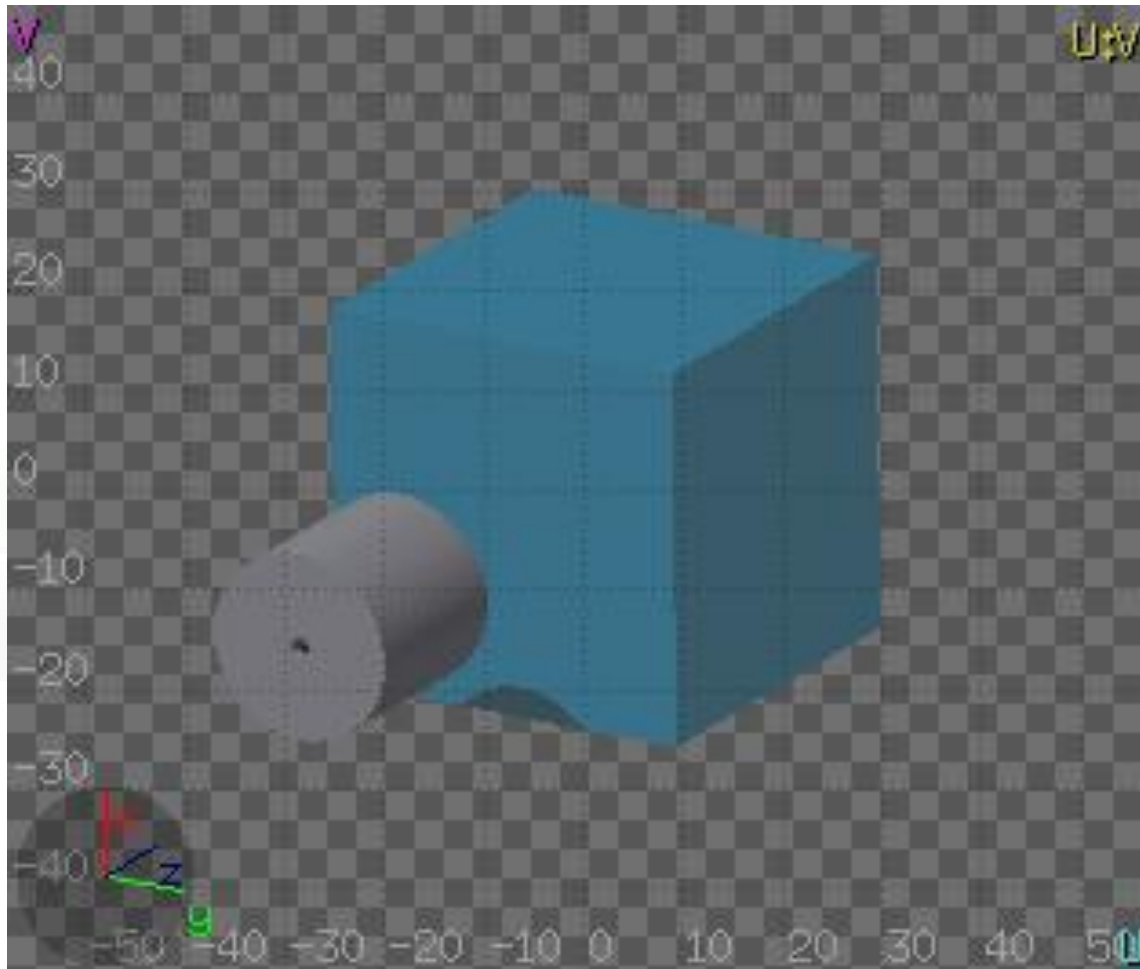
Invoking the Geometry Viewer/Editor (press F4)

The screenshot displays the Geometry Editor software interface, titled "Geometry Editor: ex_3.flair - ex_3.inp". The interface is divided into several sections:

- Menu Bar:** File, Edit, Select, Insert, Tools, View, Help.
- Toolbar:** A row of icons for various geometric operations like file management, selection, and construction.
- Object List:** A table listing objects in the model.
- Orthographic Views:** Four views showing the geometry from different perspectives: Front, Top, Left, and Back. Each view has a coordinate system (x, y, z) and a grid.
- Properties Panel:** Located on the right side, it shows options for "Opt" and "Fmt: COMBNAME", and several "z: 0.0" and "z: 20. Hz: 20." entries. A "Volume:" label is also present.
- Taskbar:** At the bottom, it shows the Windows taskbar with the current application window "Geometry Editor..." and the system clock showing 10:28.

| Type | Name |
|--------|---------|
| SPH | blkbody |
| SPH | void |
| RPP | target |
| RCC | EXTcyl |
| RCC | INTcyl |
| REGION | BLKBODY |
| REGION | VOID |
| REGION | PHANTOM |
| REGION | COLL |

Rendering 3D





Enjoy!!