

Flair: Graphic User Interface of FLUKA

The screenshot displays the Flair GUI interface. At the top, there are tabs for 'Input', 'Geometry', 'Run', and 'Plot'. Below these is a ribbon-style toolbar with various icons for file operations and editing. The main window is titled 'Input' and contains a text editor with the following content:

```
#define jng :0
#define test2
#define test3 :1
TITLE n_TOF lead target
#define test4 :2
#define CUT :
GLOBAL Max #reg: Analogue: DNear:
Input: Names Geometry: Free
DEFAULTS NEW-DEFAULT
BEAM Beam: Energy E: 0.3 Part: PROTON
Delta: Gauss Delta(FWHM): 0.082425 Delta: Gauss Delta: 1.7
Shape(X): Rectangular Delta: =2*fwhm Shape(Y): Rectangular Delta:
BEAMPOS x: 2.2632 y: -0.5 z: -10.0
cosx: 0.17364818 cosy:
GEOBEGIN Log: Acc: Opt:
Inp: Out: Fmt: COMBNAME
```

Below the input editor, the 'Flair' window shows the title 'n_TOF lead target' and a 'Notes' section containing a 2D simulation plot. The plot shows a distribution of particles in a coordinate system with x and y axes ranging from -10 to 40. A color scale on the right indicates intensity from 1 to 100. A green notification box at the bottom right of the plot area contains the following text:

Loaded project
Project: ntof33.flair
Input: ntof33
Dir: /home/bnv/prg/physics/fluka/flair/examples

At the bottom of the GUI, a status bar displays 'Inp: ntof33.inp', 'Card:1', 'Displayed:80', and 'Total:82'. A 'Quick access' button is also visible in the bottom right corner.

Starting the Geometry Editor

The screenshot shows the Geometry Editor software interface. The main window is titled "[untitled] - flair". The top menu bar includes "Flair", "Input", "Geometry", "Compile", "Run", and "Plot". The "Geometry" menu is circled in red, and a red arrow points from a callout box to it. The callout box contains the text "Click on 'Geometry' Tab". Below the menu bar is a toolbar with various icons for editing and viewing. The main workspace is divided into four orthographic views: "Front", "Top", "Left", and "Back". Each view shows a 3D coordinate system with axes labeled x, y, and z. The "Front" view shows the x-z plane, the "Top" view shows the x-y plane, the "Left" view shows the y-z plane, and the "Back" view shows the x-z plane from the opposite side. The status bar at the bottom displays the coordinates: "Inp: x: -72.45762712 y: 52.96610169 z: 0".

Click on "Geometry" Tab



Geometry editor

- Working on 2D cross sections of the geometry;
- Interactive visual editing of the geometry in 2D;
- Debugging bodies/regions in a graphical way;
- Fast 3D rendering of the geometry;

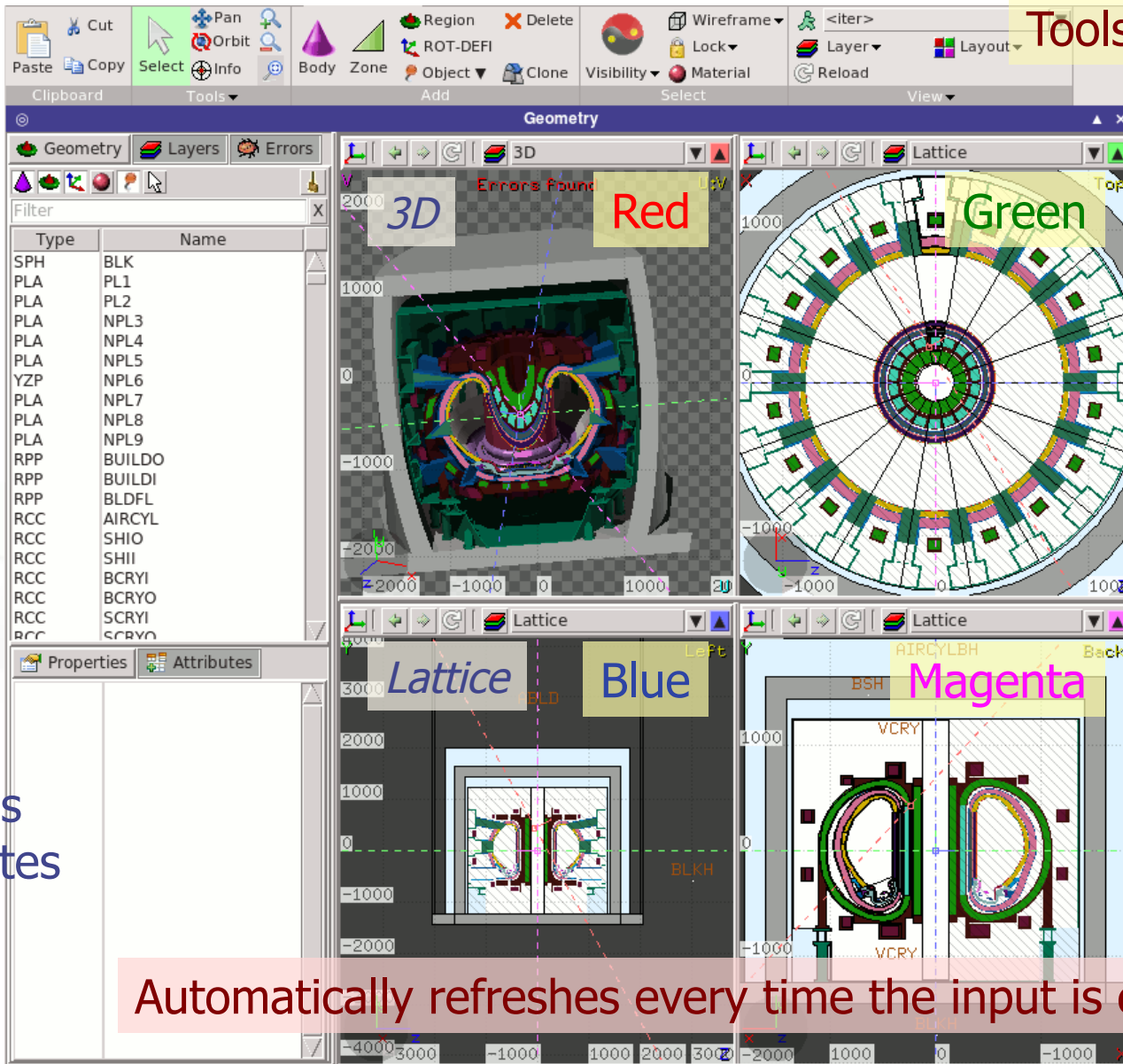
Pros

- Fast display of complex geometries;
- Many user-customizable layers;
- Graphical editing of the bodies with snapping mechanism to generate accurate coordinates;
- Visual selection and editing of zones **w/o the need to know the orientation of bodies**;
- Use real curve of bodies with no conversion to vertices/edges;
- Interactive debugging with information of problematic bodies, regions and/or zones;

Cons

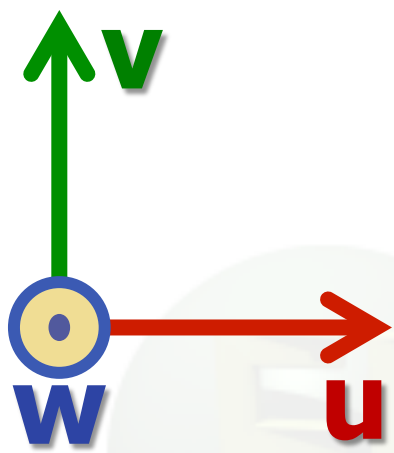
- Tricky to orientate in an unknown geometry;
- Difficult to find region using the expression;

Geometry Editor: Interface



Automatically refreshes every time the input is changed

Viewport axes System

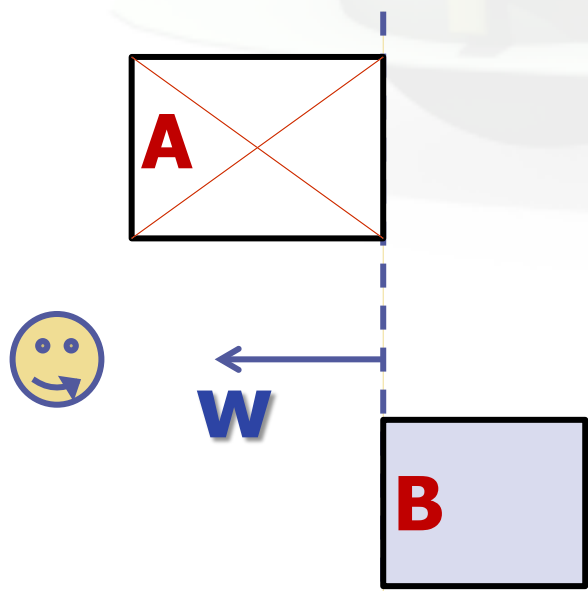


Each viewport is defined by:

- **Origin** center of viewport
- **Basis** relative axes system u, v, w . w is coming out of the screen towards the user
- **Extends** zooming

Note:

- Each viewport is facing towards negative $-w$
- If bodies A, B are touching the viewport like on the plot.
- Only body B will be **visible**



Navigation - Keyboard

- [arrows] pan viewport
- Ctrl + [arrows] + [Shift] orbit viewport around **u,v** axes rotates by 90°
- Page Up/ Page Down pan viewport front/back
- Ctrl + PgUp/PgDn rotate viewport around **w** axis
- = / - zoom in / zoom out
- 0 open projection dialog to set the **origin/basis/save/recall** etc...
- 0 (zero) Center to origin
- 1, 2 **front [X:Y] / back [-X:Y]**
- 3, 4 **left [Z:Y] / right [-Z:Y]**
- 5, 6 **top [Z:X] / bottom [-Z:X]**

Assuming:
Z = direction of the beam (horizontal)
X = horizontal
Y = vertical

Navigation – Mouse [1/2]

With the **left** mouse button:

1. Select the appropriate action pan/orbit/zoom with:
 - I. Menu → Tools
 - II. Toolbar
 - III. Keyboard shortcut
2. Click and drag the desired viewport

	function	key	description
	Pan	x	Pan viewport
	Orbit	t	Orbit viewport using a virtual t rackball
	Zoom	z	Drag area to zoom In ([Ctrl] to zoom out)
		Shift-Z	Zoom viewport on selected items
		Alt-Left	Go to previous in history projection
		Alt-Right	Go to next in history projection

Navigation – Mouse [2/2]

- With the **middle** mouse button
 - alone Pan/Move viewport
 - **Ctrl** orbit projection using a virtual trackball
 - **Ctrl-Middle-Shift** orbit projection using a virtual trackball with steps of 15 degrees
 - **Shift** select rectangle region and zoom into
 - **Shift-Middle-Ctrl** select rectangle region and zoom out
- **Wheel** (if any) zoom in/zoom out
 - **Ctrl-Wheel** pan/move forward or backward
 - **Ctrl-Shift-Wheel** smoother pan/move forward/backward
- With the **right** mouse button
 - alone opens popup menu
 - **Shift** pan/move viewport
 - **Ctrl** orbit projection using a virtual trackball




When **laptop mode** is enabled in the Preferences/Geometry then the **middle** and **right** buttons are **swapped**

Navigation – Viewport lines [1/2]

Description:

- Dashed lines represent other viewports (the intersection of other viewports with the current one);
- The center is represented with a square;
- Viewing direction \mathbf{w} is indicated by a short line;
- When another viewport is outside the view window, the viewport-line will be displayed on the closest edge;


3D Viewing direction

Actions: Select  + left mouse button

- Drag the center square to reposition the viewport
- Drag the line close to the center to reposition the viewport along the vertical \mathbf{w} axis
- Drag the extremities to rotate it

Navigation – Viewport lines [2/2]

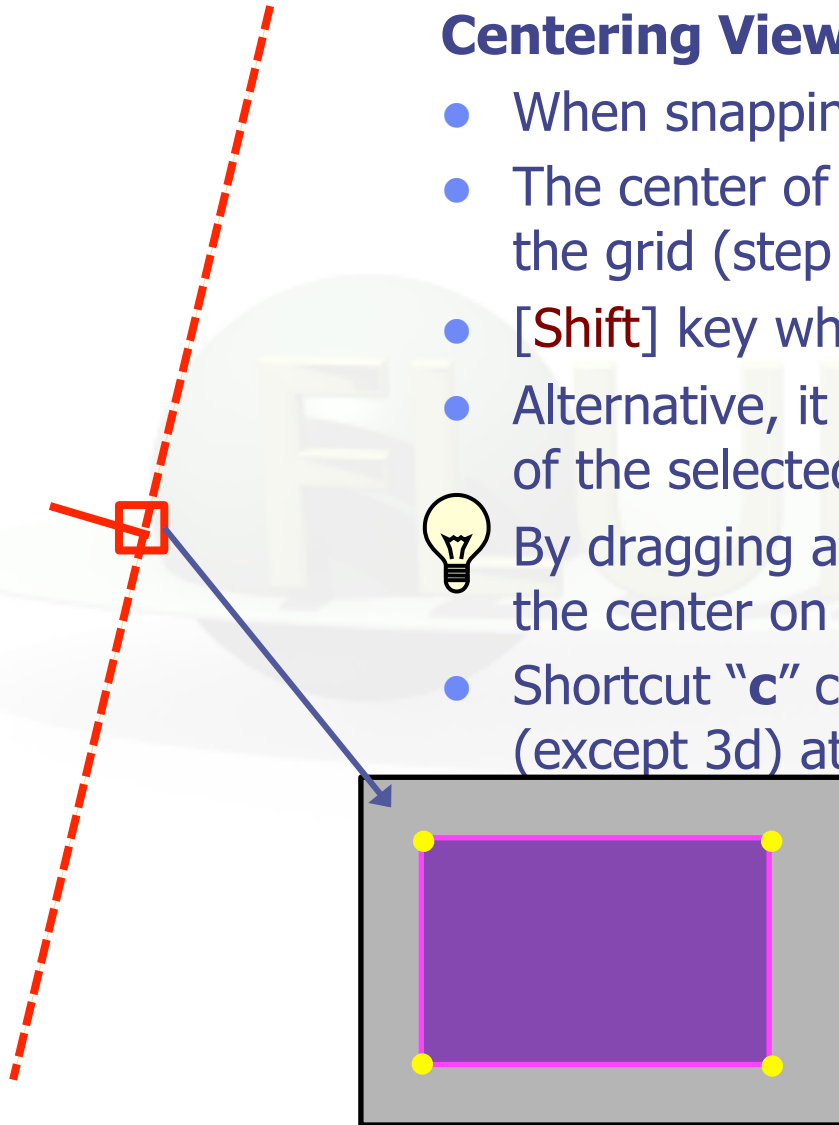
Centering Viewports

- When snapping to grid  is activated
- The center of the viewport will be aligned to the grid (step of 1/10 of the main grid)
- **[Shift]** key while toggle the snapping action;
- Alternative, it can be centered on the vertices of the selected bodies;




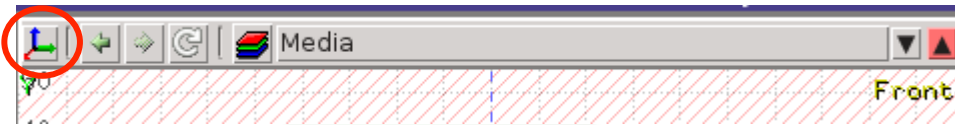
By dragging a viewport center it always moves the center on the current viewing plane.

- Shortcut **"c"** centers all other viewports (except 3d) at the mouse pointer

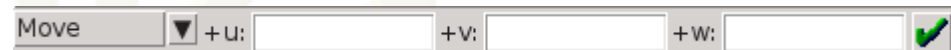


Navigation – Projection dialog

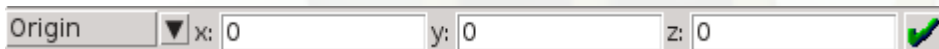
With the projection [o]  button you can change, move, shift, rotate, save and reload the projection of a viewport



Shift the coordinate system



Set the **o** origin of the viewport

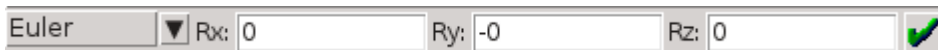


Change the reference axis



Rotate around the Cartesian axis

Shortcut: Ctrl + (1-6)



Add and Select Bookmark



Select Transformation

