Sample SIMION 7.0 Runs

Launching SIMION for the First Time

Please read (*or at least scan*) Appendix F *now*. ***It is important that you have at least some understanding of the GUI before you proceed unless you are familiar with SIMION 6.0.***

It is assumed that you have installed and tested SIMION as per the instructions in Appendix B.

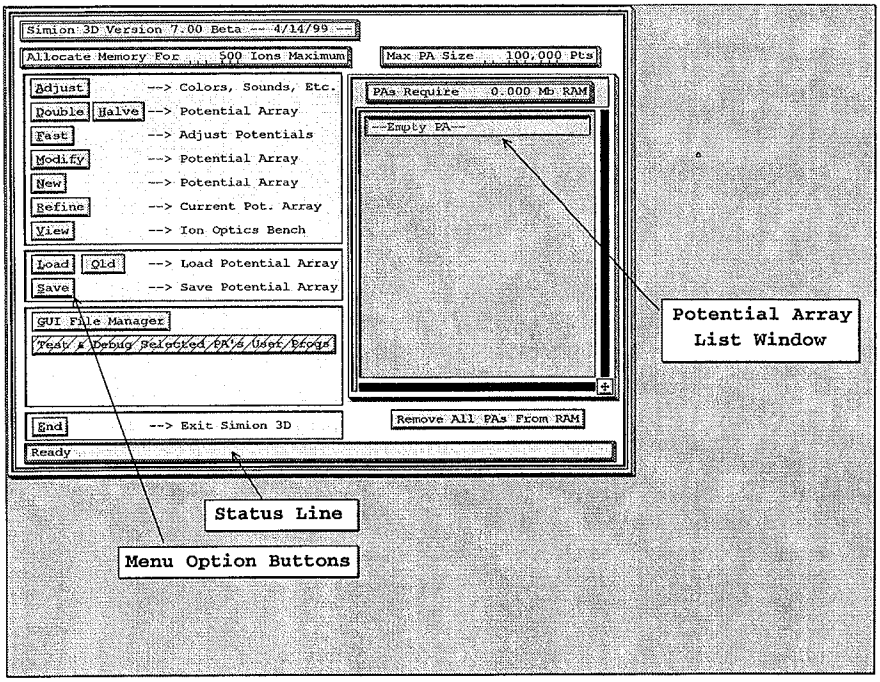

Figure C-1 SIMION's Main Menu Screen

Launching SIMION

To launch SIMION double click on the SIMION shortcut on your desktop.

Accessing SIMION Via Mouse and Keyboard

Access to SIMION by mouse and keyboard *requires* that its window have input focus (*it is the foreground window*) and that the cursor is within the client area of the window *(a GUI cursor is visible*). Move the mouse cursor into SIMION's client area (*GUI screen area*). If the cursor doesn't automatically change from a Window's cursor to a GUI cursor, click the left mouse button to establish input focus. Now the cursor will be the GUI cursor.

Notice that many buttons have their first character underlined (*Figure C-1*). This means you may access them directly from the keyboard (*when the cursor is in the window's client area*). When you move the cursor out of the client area the GUI cursor will be changed to the Window's cursor and the button underlines will be removed to tell you that the buttons are no longer keyboard accessible.

Remember: Keyboard access requires that SIMION's window has both input focus and that the cursor is in the client area (GUI cursor visible).

Getting the Lay of the Land

If all has gone well you should be looking at the Main Menu Screen (*Figure C-1 above*). Note that it is full of buttons. To select a menu option, click its button or if the first letter of the button's label has a red underline, you can access it directly from the keyboard by entering the label's first letter (*e.g. <a or A> for* **A***djust*).

Playing with Adjust Preferences

Use the **Adjust** button to adjust preferences. The Adjust Options Screen will allow you to adjust color, sounds, delays, other options (*e.g. mouse*), and video display features. Take the time to try each. Use the help screens (*including object help*) to get familiar with the GUI and how to use SIMION.

GUI File Manager

The GUI has a very powerful and easy to use file manager that is used to load and save your SIMION files (*Appendix F discusses the GUI and its file manager*). The Main Menu Screen's **GUI File Manager** button gives quick access to the file manager itself. It is suggested that you take the time to get acquainted *NOW*.

Learn about the controls, create a subdirectory, copy a few files, and you're ready to start using SIMION.

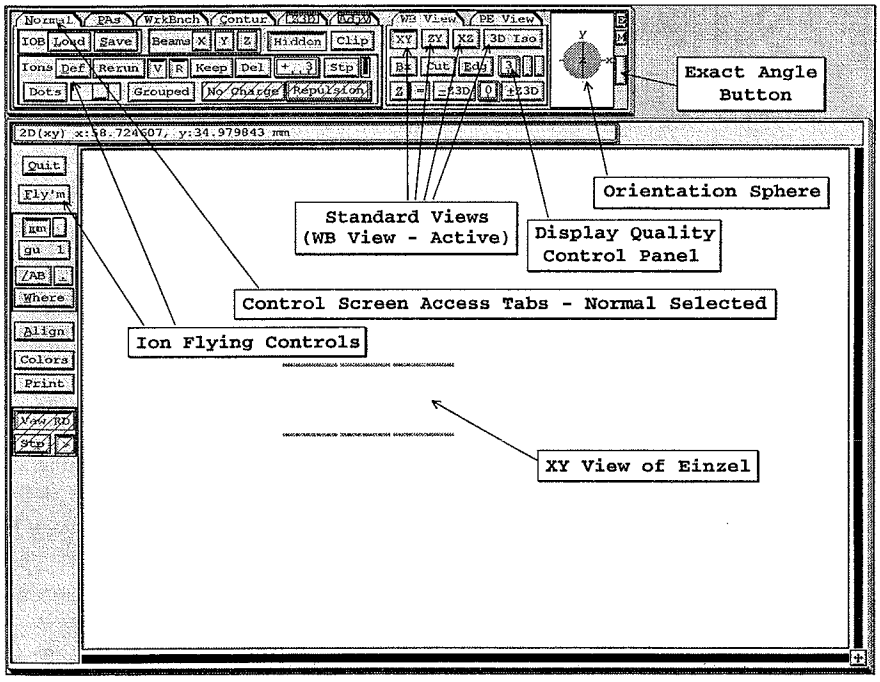

Figure C-2 View Screen showing Einzel and various features

*The program Walk-About (**WA.EXE**) is a stand-alone version of the GUI File Manager. Walk-About can be used outside of SIMION. It is provided for those who decide to adopt the GUI File Manager for more general use.*

Scan the Manual and Its Illustrations

It probably would be a good idea to quickly scan the main manual ***NOW!*** There are annotated figures throughout the main manual. These figures serve to show you where things are and how to perform tasks with SIMION. ***Remember, if all else fails, read the manual.***

Your Maiden Voyage With SIMION

1. Start SIMION (*if you haven't already done so*).

2. Press the **View** Button (*or hit the* **<V>** *key*) to access the **View** function (*no PAs loaded*).

3. The GUI File Manager will be invoked to select an **.IOB** file (**I***on* **O***ptics* **B***ench*). Click on the **EINZEL** sub directory (*below the* **C:\SIM7** *sub directory*). Now place your cursor over the **EINZEL.IOB** button and click ***both*** mouse buttons together, and the **.IOB** will be loaded along with its PA files. Click ***Yes*** to restore PA potentials. Click ***Yes*** to load the matching ion definition **.FLY** file. ***You should now be looking at an XY 2D view of an einzel lens (Figure C-2 above).***

4. Now click the **3D ISO** button to get a quick 3D isometric view of the einzel lens. ***The drawing may look a bit crude.*** Put your cursor on the display quality panel (*currently showing the number* **3**) and hit the **9** key. ***Now the drawing quality looks pretty good.***

   Click the **XY**, **ZY**, and **XZ** buttons too. These give you quick access to the standard 2D views.

5. Use the orientation sphere to change the view's orientation (*point to the sphere and drag it about with either mouse button depressed*). Try all the indexed 2D (*12 views*) and 3D (*8 views*) isometric views. Now set the drawing quality to 6 and click the exact angle button. Try various exact angles using the orientation sphere. Vary the drawing quality to see the effect on quality and drawing time (*9 can take a very long time*). ***Remember you can hit the* <Esc>** ***key to stop a re-draw if it is taking too long!***

6. Try 2D zooming. Mark an area (*drag with the* **left** *mouse button depressed*) and click the **right** mouse button (*to 2D zoom*). Click the **right** mouse button again to return to the previous view. Now hold either **Shift** key depressed and click the **right** mouse button to zoom back in. ***Up to 10 levels of 2D zoom are remembered.***

7. Try 3D zooming (*volume zooming*). Switch to the 2D end view of the einzel (*looking down the cylinders - hint -* **ZY** *button*), mark a region that ***encloses slightly more*** than the right half of the cylinder (*we don't want to cut off any future ion trajectories in the center*), and click the **+Z3D** button. Now rotate to a 3D view orientation (*hit:* **3D Iso** *button or use orientation sphere*). ***You are now looking inside the einzel cut in half along its length.***

8. Now let's fly some ions! Click the **Fly'm** button (*to start the ions flying*). The ions should fly one at a time. ***You can change views, zoom or whatever as the ions fly.***

9. To fly the same ions as a group click the **Grouped** button and then the **Fly'm** button.

10. To continue to re-fly the same ions as a group, click the **Rerun** button too. Now click the **Fly'm** button. If you like, now click the **Dots** button to see the ions fly as dots. Adjust

their speed with the slider control (*just to the right of the* **Dots** *button*). Adjust the trajectory quality panel to zero (*was initially 3*). Notice that the trajectories are faster. Try other trajectory quality levels to see their effect. Hit **<Esc>** or click the **Fly'm** button to stop the ions flying.

11. You can adjust voltages while the ions are flying. Get the ions flying as rays or dots **Grouped** in a **Rerun** mode. Set trajectory quality to zero for fast ion flying. Now click the **PAs** tab and Click the **Fast Adj** button. Set the voltages you want, Click the **Fast Adjust** button, the voltages are adjusted, and **View** returns with the ions still flying (*powerful*). Click the **Normal** tab to return to the Normal Controls Screen.

12. For beam repulsion, make sure that **Grouped** is depressed, select **Beam Repl** (*click button to right of* **Grouped** *three times*), **Rerun**, and turn off **Dots** (*optional*). Now **Fly'm**. As the ions fly, adjust beam current to 10^{-6} amps (*panel to right of* **Beam Repl**) and note the beam divergence. Try to find the threshold of the effect and note where the beam deviates the most.

Your Second Voyage With SIMION

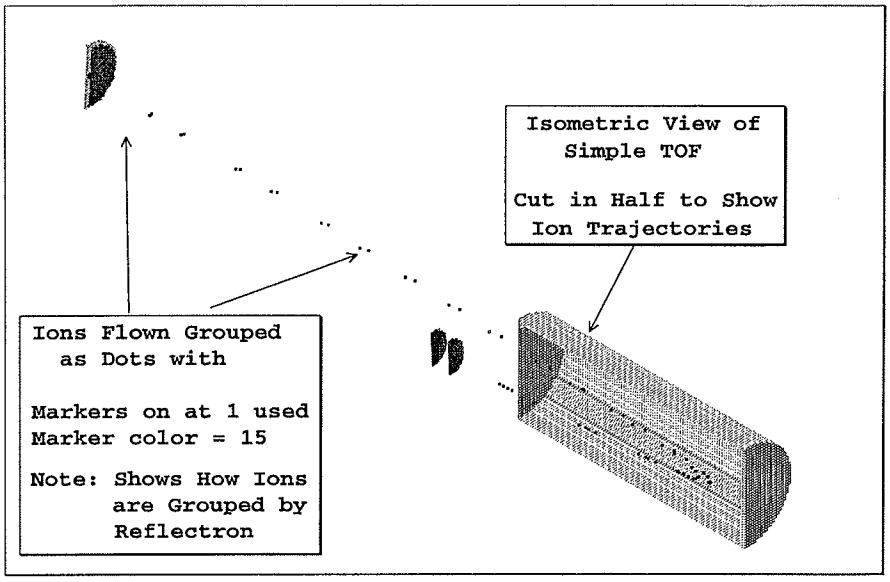

Figure C-3 Ion group trajectories in a cut open reflectron TOF

1. Start SIMION from the program directory (*e.g.* **C:\SIM7)** or click the **Remove All PAs from RAM** button (*Main Menu Screen*) to remove your previous adventure.

2. Press the **View** Button (*or hit the* **<V>** *key*) to access **View** (*no PAs loaded yet!*).

3. The GUI File Manager will be invoked to select an **.IOB** (***Ion Optics Bench***) file. Click on the **TOF** subdirectory (*below the program directory*). Now place your cursor over the **TOF.IOB** button and click ***both*** mouse buttons together, and the **.IOB** file will be loaded along with its PA files. Click ***Yes*** to restore PA potentials. Click ***Yes*** to load the matching ion definition **.FLY** file. Click ***Yes*** to load the matching data recording ***.REC*** file. You should now be looking at an XY 2D view of a three element Time-of-Flight (*TOF*) system. Turn display quality to 6. Click the **Vew RD** button (*bottom left edge*) to turn off data recording display screen.

4. Swing to an end view and cut the view in half with a 3D zoom. Note: We want to see inside the reflectron. Be sure that ***more than half is visible*** so you haven't cut away the ion trajectories themselves (*as in Figure C-3 above*).

5. Set **Grouped**, **Dots**, and **Rerun**. Now **Fly'm**. Four ions will be flying. Ions of the same color have the same mass (*but different energies*). Note how the ions reflect in the reflectron and time converge at the detector.

6. Let's look at some numbers. Click the **Vew RD** button to depress it. Notice that data recording display screen reappears and the ion impact times are displayed. You can turn the data display screen on and off as well as step from event to event. Use the **F1** help key to learn how.

7. Change the computational quality from 3 to 0. This turns off the boundary checking features. Note that time convergence erodes when quality is set to zero.

8. Try other views (*2D and 3D*) including exact angles. Try zooming in to see details (*2D and 3D zooms*).

9. From the XY 2D view (**XY** *button depressed*) click the **PE View** tab and watch the ions reflect in the potential energy field of the reflectron. Note that only the PE surface of the reflectron is visible. This is because the other two instances are off about 3 degrees (*non-integrally aligned*) and thus not displayed in a PE view.

10. To view the PE surface of the source element, exit PE view (*click* **WB View** *tab*), click the **PAs** tab and use the instance selector to select the source element PA (*green box will surround it*). Now click the **Align** button and ***then*** the **PE View** tab. Note: Ions could have been flying during this process. If you have turned them off, click the **Normal** tab and click **Fly'm** button to resume ion flying.

Your Third Voyage With SIMION

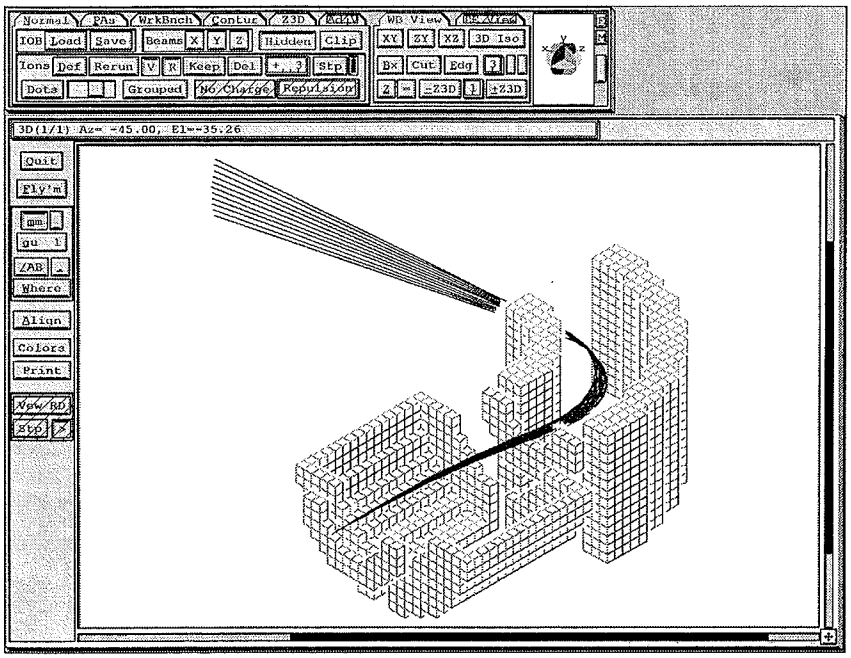

Figure C-4 Cutaway view of ions flying through TEST3D.IOB

Most of SIMION's demos are found in directories with leading underscores (*e.g.* **_MISC**). The leading underscore means that you are required to do some preparation before these demos can be used (*normally just refining arrays*). These directories all have **README.DOC** files to tell you what to do. ***Always read the README.DOC file and perform the preparations before trying to run the demos.***

The third voyage (*Figure C-4 above*) involves the leading underscore directory **_MISC**. ***The instructions below will tell you how to prepare the selected demo.***

1. Start SIMION by double clicking its shortcut or click the **Remove All PAs from RAM** button to remove your previous adventure.

2. These are the instructions for preparing this demo (*first time only*). ***Skip this step on any subsequent running of this demo.***

   Click the **Load** button (*or hit the* **<L>** *key*) to load a potential array directly. The GUI File Manager will be invoked to select a PA (*potential array*) file. Click on the **_MISC** sub directory (*below the program directory*). Now place your cursor over the **TEST3D.PA** button and click ***both*** mouse buttons together, and the **.PA** file will be loaded. Click the **Refine** button and then press the **<Enter>** key to refine the potential array. After the refining is completed the main menu will return. Click the **Save** button and press the **<Enter>** key. You will be asked if you want the file replaced - click the **Yes** button (*or hit the* **<Y>** *key*). A file memo will appear for you to edit. Skip this by clicking the **right** mouse button. Now click the **Remove All PAs from RAM** button to remove the potential array from RAM for a clean start.

3. Press the **View** Button (*or hit the* **<V>** *key*) to access **View** (*no PAs loaded yet!*).

4. The GUI File Manager will be invoked to select an **.IOB** file. Click on the **_MISC** sub directory (*below the program directory*). Now place your cursor over the **TEST3D.IOB** button and click ***both*** mouse buttons together, and the **.IOB** file will be loaded along with its

PA files. Click ***Yes*** to restore PA potentials. Click ***Yes*** to load the associated ion definition **.FLY** file. You should now be looking at an XY 2D view of a 3D potential array. Swing to an Isometric view to verify. Turn display quality to 9.

5. If you didn't restart SIMION after the TOF example above, you will need to turn ion time markers and data recording off. Click the **Def** button (*on the Normal Control Screen*) to gain access to the Ion Definition Screen. Click the **Draw** and **Record** buttons to raise them (*turning markers and data recording off*). Now click **OK** to return to the View Screen.

6. Make sure **Grouped** and **Rerun** are OFF. Now **Fly'm**.

7. Now swing to a 2D view and make a 3D cut to show the lower half of the workspace. Look at this with the various 3D views.

8. From an isometric view use page view (*right mouse button depressed on window's button*) and the **<Alt>** key to do some 3D pointing and cutting. Refer to the manual for details.

9. Try to 3D zoom to a small volume inside the lens system. Now use the **Cut** button to get cutaway views of the process.

10. Explore the window's and view's help screens (*they are different*). See any new tricks? Try them.

11. Another thing to try is to cut the volume in half with a 3D zoom (*as above*). Look in from above (*2D view*). Switch to a **PE View**, click the **Z3D** tab, and then move the top surface of the 3D cut up and down (*using the sizing panels*). See how the shape of the PE surface changes?

Other Adventures

You will note that there are a number of demo directories below your program directory. Snoop around and try them all (*after you've read more of the manual*). If your PA memory becomes too cluttered Click the **Remove All PAs from RAM** button to clean the mess up.

> *Note: Many of the demo directory names begin with a leading underscore* (e.g. **_DRAG**). *In order to maximize the compression of the demo files* (to facilitate distribution) *the potential arrays in these directories were not refined* (all non-electrode points were set to zero). **This means that you must perform certain actions on the files in these directories before their demos can be run successfully**. *Each directory contains a* **README.DOC** *file that explains what actions you must take to prepare their demos.* **Be sure to read this file and perform the required actions before trying to run any demos in a leading underscore directory**.

Note: You can now start creating your own PAs (*2D and 3D*) or load older version SIMION PA files. ***Be sure to create a project directory first and use it for your initial floundering***. Have fun!

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