Array Instance Labs

Introduction

These labs are designed to demonstrate important aspects of array instances.

Location: C:\Advance SIMION Class\03. Trajectories and Instances\Instance Lab

Orienting an array instance

This lab selectively orients an array instance of an einzel lens.

1. Load the **Einzel.iob** file into View.

2. Click the **3D Iso** button for an isometric view.
   Turn up display quality to 6.

3. Click the **PAs** tab.

4. Click the **?** button and examine the instance's parameters.
   Move the cursor to the upper right corner of the data display.
   Notice that the cursor switches to a double headed arrow.
   Now drag (mouse button depressed) this corner to enlarge the data display to see all parameters.
   Click the **Print** button and print a copy of these parameters.
   Notice that all instance parameters have their default values (this will change).
   Click **Vew RD** button to turn off the data display.

5. Click **Edit** and then the **More** buttons to gain access to instance edit screen number two.
   (It is suggested that you have **where** active in **mm abs** and switch views to examine changes)
   Set the Rt angle to +90 degrees (watch what happens in view for the next steps).
   Set the El angle to +45 degrees
   Set the Az angle to +30 degrees
   Set Xwo (x working origin) to –100 gu (notice that the working origin is still at the WB origin)
   Click the **Back** button to access instance edit screen number one.
   Set Ywb (y workbench offset) to 100 mm (working origin is now 100mm above the WB origin)

6. Does what you observe agree with the order of transformations described in the lecture?
   Now try orienting the instance yourself.
   Notice that SIMION always expands the workbench volume to include all instances.
   However it doesn't automatically shrink the workbench volume.
   To minimize this volume, click the **Wrkbnch** tab and click the **Min** button.
   While you're there add 1,000 mm to Xmax to expand the workspace beyond the array.

Adding a new array instance

This lab adds a second separately controllable einzel instance into the workbench volume.

1. Click the Remove All PAs from Ram button on the main menu screen to remove our prior mess.

2. Load the **Einzel.iob** file into View.

3. Now mark a region to the right of the current einzel instance for locating the new einzel instance.

4. Click the **PAs** tab and the **Add** button.
   Select the file **einzel.pb0** and depress **both** mouse buttons.
   Click the **Done** button to accept your fate.
   The new instance is number 2.
   Edit it if it needs to be moved or sized a bit.

5. Now try flying ions through both instances.
   Make sure instance 2 is centered in y and z.
   Change the scaling of instance 2 to 0.5 mm/gu.
   Fly the ions.
   Try a slight miss-alignment (offset or angular).

6. Change the potentials of each instance separately (**PAs** tab selected):
   Select the instance number (e.g. 2).
   Click the Fadj button and adjust the instance's potential.
   Fly the ions.
   Repeat the process with the other instance (e.g. 1).
   Run one instance as an acceleration and the other as a deceleration einzel.

Superimposed instances

This lab uses two superimposed instances to demonstrate instance priority and the isolation of fields within an instance.

1. Remove all PAs from ram.

2. Load the file **mirror.iob** into view and click the **Fly'm** button.
   An instance of the einzel lens has been superimposed on a tube instance with a field free internal volume and end ideal grids and electrodes that can be used as reflectors.

3. Notice that the ions that go through the einzel are focused.
   However, ions that fly near the outside of the einzel are not affected. Why? They should be.
   What does this tell you about superimposed instances.

4. Now click the PAs tab, select instance 2 (einzel.pa0), click the L- button and the Yes button.
   Re-fly the ions.
   What do you see? Explain what is causing this change. Why is this knowledge important?

5. Use data recording to show: ion number and instance number when instances change (verbose). Compare the results when the einzel.pa0 instance is 1 or 2.
   Explain. Would this be a good troubleshooting method for instance priority?

6. For a little fun, set the left and right reflector voltages to 1000 V and fly all ions grouped (data recording off).