

Day 4 Detectors

To run these examples the large PA# files must be refined first, once they are refined and saved they no longer need to be refined when running the examples. The procedure to refine a file is:

- a. Select Load, then select **the file.pa#** (left click when cursor is on the file), then OK.
- b. Select Refine, set Convergence Objective (lowest green panel) to 5 e-6 or lower.
- c. Push the Refine Fast Adjust Array button. Refining will take about from one to several minutes depending on the size.
- d. Push the Remove All PAs from Ram button.

Here are the files that need to be refined in this section:

∞ ETP Multiplier 3D.pa#

1. Faraday cups

- i. From the main menu push Remove All PA's from RAM.
- ii. Push View, select **generic fc.iob**
- iii. **Fly'm**, set the **_y_Random_Offset_mm** to 1.0.
- iv. Select the PAs tab, change the instance number to 1, push Edit then More and set the El value to 2 degrees (this rotates the cup so that the back moves only ~0.7 mm).
- v. Fly'm again. Note that the ions now strike near the front of the Faraday cup.
- vi. Select the PAs tab, push Edit then More and set the El value back to 0 degrees.
- vii. Select the Normal tab, push Def, and load **low energy electron.fly** and Fly'm. No electrons escape, because the suppressor is at -50 volts.
- viii. Mark the area that just includes the front of the cup and the electron trajectories and push the +Z3D button on the WB View tab, then select the PE View tab and push the Positive Ion button to change it to Negative Ion. Note that the suppressor field does not provide 50 volts evenly across the opening.
- ix. Press the WB View tab, Select the Normal tab, then Def, then load **low energy ions.fly**, and Fly'm. What happens in this case?
- x. The secondary ions and electrons that are emitted have a fairly broad energy distribution, which complicates the situation further.

2. Discrete Dynode electron multiplier

- i. From the main menu push Remove All PA's from RAM.
- ii. Push View, select **Dis Dyn Mult.iob**. On the WBView tab push the 3D Iso button, rotate the model around so you can get a feel for what it looks like, then switch to the XY view and fly'm. What do you notice?

- iii. On the Normal tab push Def and Load dynode 2.fly, fly'm. Push the Keep button, then the Def button and load dynode 3 & 5.fly; fly'm.
- iv. Push the Keep button, then the Def button and load dynode 4.fly.
- v. If you have the time and interest go into the ion definition screens for these files and change the First Z value to 13 to see the effect of the beam striking the dynode off to one side.
- vi. Note: using the Merge button on the ion definition screen several files of ions can be loaded simultaneously, however there is a limit of 25 trajectory groups so you may need to pair down the number of groups flown from each dynode. An example is shown in the file *all dynodes.fly*.