

12.a Measured Magnetic Fields

- Problem: How to simulate measured magnet fields with SIMION
- Solution: Save the magnetic field data in an ASCII file, load the data file into a user program array, and use Mfield_Adjust to define the fields



Tricks Used

- Potential Array data used to create data file
- Data file loaded into user program array
- Mfield_Adjust uses linear interpolation of array data to define magnetic fields to SIMION

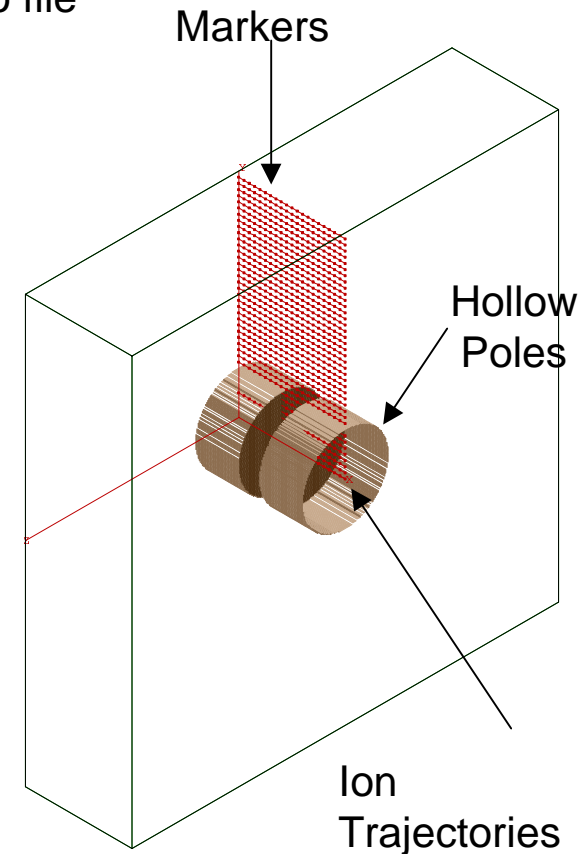


Potential Array to Data File

- Fly neutrals on array intervals
- Use hollow electrodes (edge filled)
- Use time markers and data recording

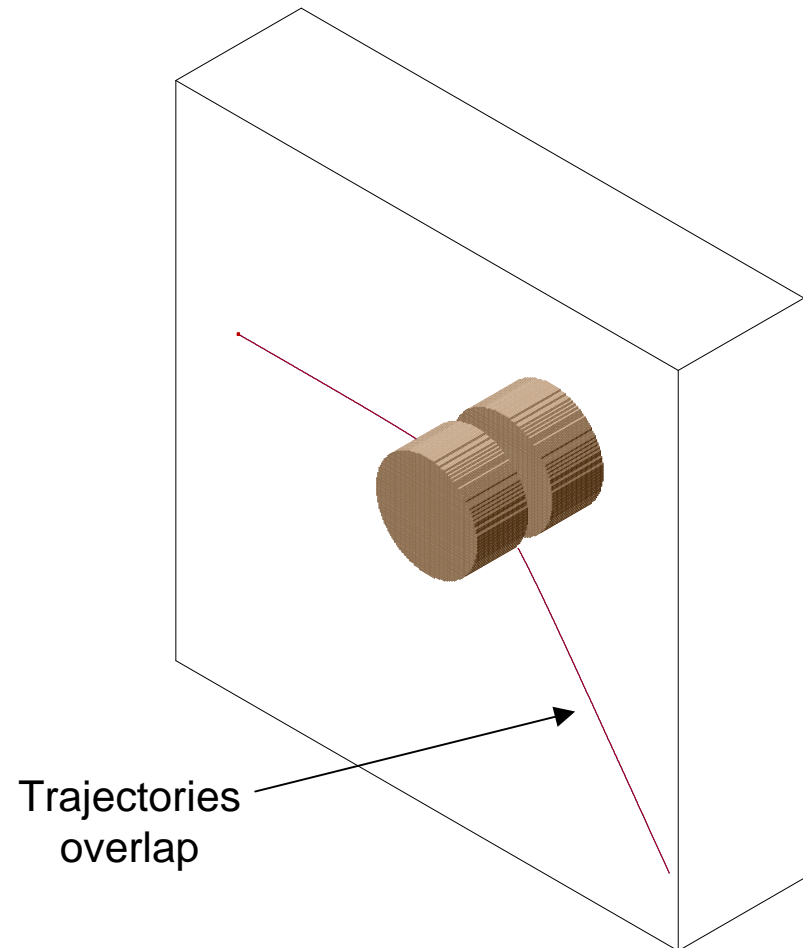
Bx and Br saved to file

```
0.0947490, 1.4175235
0.5186241, 1.3970214
0.9773564, 1.3428307
1.4125314, 1.2562471
1.8136513, 1.1393440
2.1710313, 0.9949253
2.4760340, 0.8264622
2.7212801, 0.6380121
2.9008302, 0.4341229
3.0103322, 0.2197232
3.0471302, 0.000023
3.0103314, -0.2197185
2.9008287, -0.4341181
2.7212779, -0.6380072
2.4760311, -0.8264571
2.1710278, -0.9949200
1.8136473, -1.1393384
1.4125271, -1.2562413
0.9773517, -1.3428245
0.5186192, -1.3970149
0.0947489, -1.4175166
0.0891014, 0.9276216
0.4877095, 0.9142030
0.9190918, 0.8787357
1.3283116, 0.8220687
1.7054955, 0.7455607
2.0415373, 0.6510484
2.3283181, 0.5408047
2.5589040, 0.4174856
2.7277158, 0.2840675
2.8306655, 0.1437747
2.8652626, 0.0000016
2.8306658, -0.1437715
2.7277144, -0.2840642
2.5589019, -0.4174823
2.3283154, -0.5408012
2.0415341, -0.6510447
1.7054918, -0.7455569
1.3283075, -0.8220647
0.9190873, -0.8787314
0.4877049, -0.9141986
0.0891013, -0.9276169
0.0857290, 0.4732526
0.4692499, 0.4664061
0.8843014, 0.4483099
1.2780242, 0.4193976
1.6409178, 0.3803628
1.9642212, 0.3321431
2.2401249, 0.2758985
2.4619605, 0.2129843
2.6243633, 0.1449190
2.7234042, 0.0733475
2.7566862, 0.0000009
2.7234036, -0.0733457
2.6243620, -0.1449173
2.4619585, -0.2129825
2.2401223, -0.2758966
1.9642180, -0.3321411
1.6409142, -0.3803607
1.2780202, -0.4193955
0.8842971, -0.4483077
0.4692455, -0.4664038
0.0857289, -0.4732501
```



Comparison Simulations

- Fly first ion in potential array's Field
- Fly second ion in data file's field
- Trajectories are almost identical



For More Information

- See the Measured Magnetic Fields demo in the user program reference directories
- Useful strategies
 - Ways to create data file from array data
 - Use of data files and user program arrays to simulate fields
 - 2D structure array addressing
 - Linear interpolation of fields
 - Conversion of 2D fields into 3D fields

