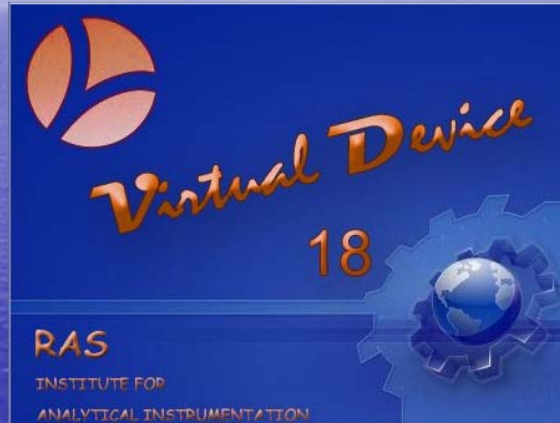
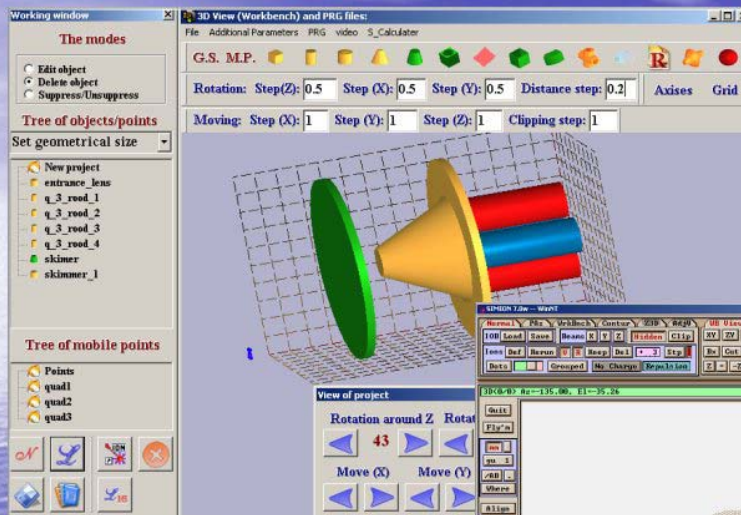


The best solution for rapid investigation with SIMION.



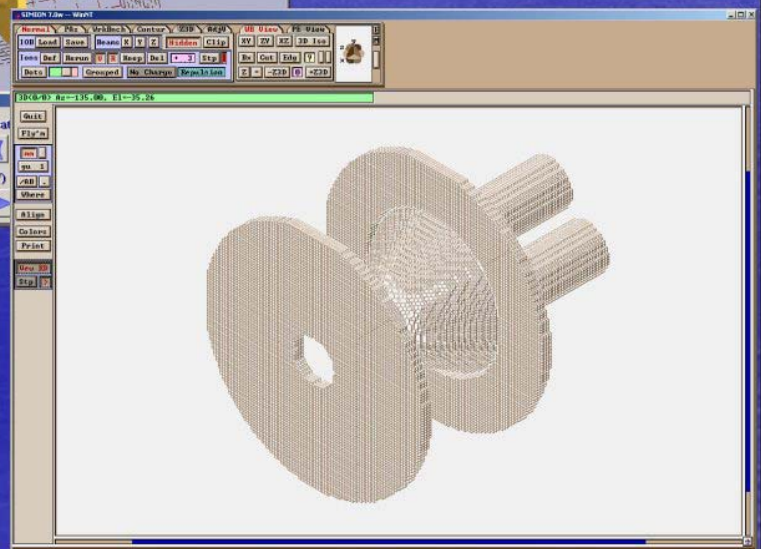
Virtual Device is an Add-on software to SIMION v.7 and further versions.
Covers several features not fully developed in SIMION.

CAD program allows to quickly create very complicated geometry and transform it to SIMION.



CAD program is based on the idea that a user can use finite number of electrodes to recreate specific geometry, and each typical electrode can be represented as a bit of program in SIMION language.

Advantages of this way of creation:
1. Very quick creation of 3D geometry.
2. Very simple way of rearranging of geometry (shifting & moving electrodes relatively to each other).
3. Automatic transformation of 3D geometry into geometrical file (GEM file).

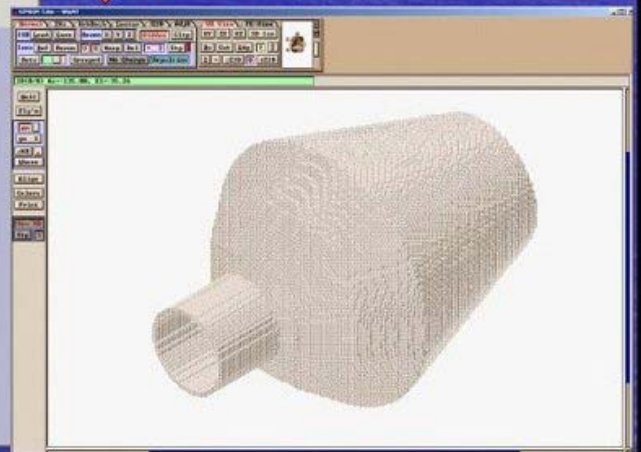
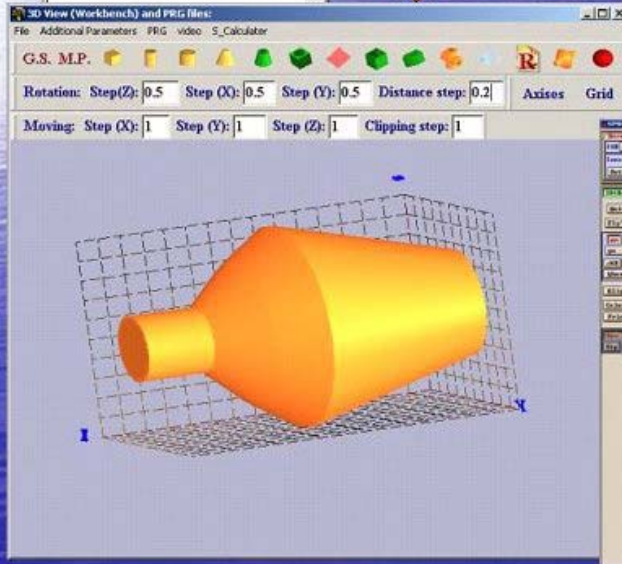


CAD program gives possibility to create geometrical object with axial symmetry where electrode profile can be loaded from txt file.

axial symmetry object	Файл	Правка	Формат	Вид
Справка				
0	50	50	25	
80	50	50	50	
100	50	50	35	
120	50	50	15	
150	50	50	5	

Some profiles of electrodes with axial symmetry are results of numerical simulations. Those profiles can be stored in txt files and easily incorporated in to SIMION by

Virtual Device.

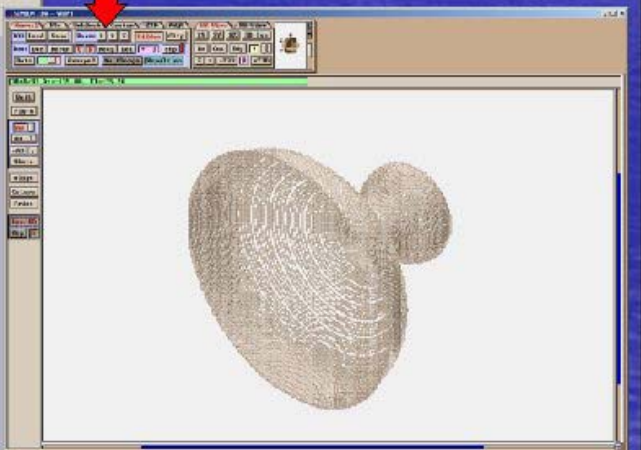
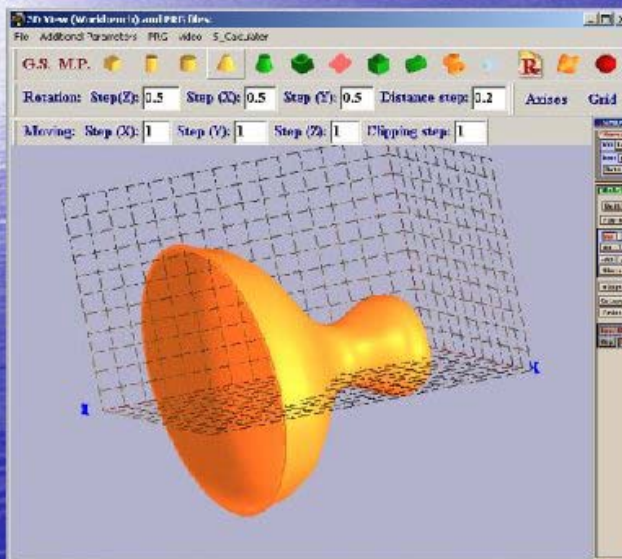


CAD program gives possibility to create geometrical objects with axial symmetry where electrode profile can be expressed by analytical formulas.



Scientific calculator option allows calculation of functions whose graphs may be used as profiles of 3D objects with axial symmetry.

This gives a user a very powerful tool to develop complicated ion optics schemes.



Virtual Device allows loading results of SIMION's simulation and carrying on two-event analysis, where the first event is ion's birth, and the second is event of ion's death.

The screenshot shows the SIMION Data Analysis interface. On the left, there are several configuration panels:

- What Data Elements to Record:** Includes checkboxes for Ion n, Events, TOF, Mass, Charge, Instance En, and Instance Mn. Below these are fields for X, Y, Z, Ut, Azn, Elv, Ux, Uy, Uz, and buttons for E, grad E, dE/dx, dE/dy, dE/dz, B, and Bx.
- When to Record These Data Elements:** Options include Ion's Start, Ion's Every Time Step, and Ion's. Specific events like Entering an Instance and Crossing Discontinuities are also listed, along with X and Y coordinates (e.g., X = + 0.000 mm).
- Format to Use For Recorded Data:** Includes options for Include Header, Date & Time, Flight Settings, Notes, Verbose, Delimited, By (F, E, G, V), Leading Spaces, and Form Feed (Before Each).

 On the right, a data table is displayed with the following columns:

Nº (column 0)	Event (column 1)	TOF (column 2)	Mass (column 3)	charge (column 4)	X (column 5)
1	1	0	118.09	1	158
2	1	0	118.09	1	158
3	1	0	118.09	1	158
4	1	0	118.09	1	158
5	1	0	118.09	1	158
6	1	0	118.09	1	158
7	1	0	118.09	1	158
8	1	0	118.09	1	158
9	1	0	118.09	1	158
10	1	0	118.09	1	158
11	1	0	118.09	1	158
12	1	0	118.09	1	158
13	1	0	118.09	1	158
14	1	0	118.09	1	158
15	1	0	118.09	1	158
16	1	0	118.09	1	158
17	1	0	118.09	1	158

Below the table, a green text box states: "It gives a powerful tool for quick typical investigation in ion optics."

Virtual Device provides one of important routine investigation methods - phase space analysis.

The screenshot shows the SIMION Data Analysis interface for phase space analysis. The top panel includes tabs for "Space and Phase distribution" and "Histograms/Resolving power". Below these are buttons for "Distrib. in XY plane", "Distrib. in ZX plane", "Phase distrib. (Vy: Y)", "Detector/Accept.", "Distrib. in ZY plane", "Phase distrib. (Vx: X)", and "Phase distrib. (Vz: Z)".

The data table on the left is partially visible, showing columns for Nº, Event, TOF, and Mass.

The main part of the screenshot is a "Phase (Vy: Y)" plot. The x-axis is labeled "Y" and ranges from 95 to 115. The y-axis is labeled "Vy" and ranges from -1 to 5. The plot shows a dense cloud of red data points forming a fan-like shape that expands as Y increases.

Below the plot is a "Set up detector/Acceptance" dialog box with the following fields:

X (center): 100	X (width): 10	Vx (center): 10	Vx (width): 10
Y (center): 100	Y (width): 30	Vy (center): 0	Vy (width): 10
Z (center): 100	Z (width): 10	Vz (center): 10	Vz (width): 10

 Buttons include Load, Save, Apply, D. filtr. ZX, D. filtr. ZY, D. filtr. XY, and Close.

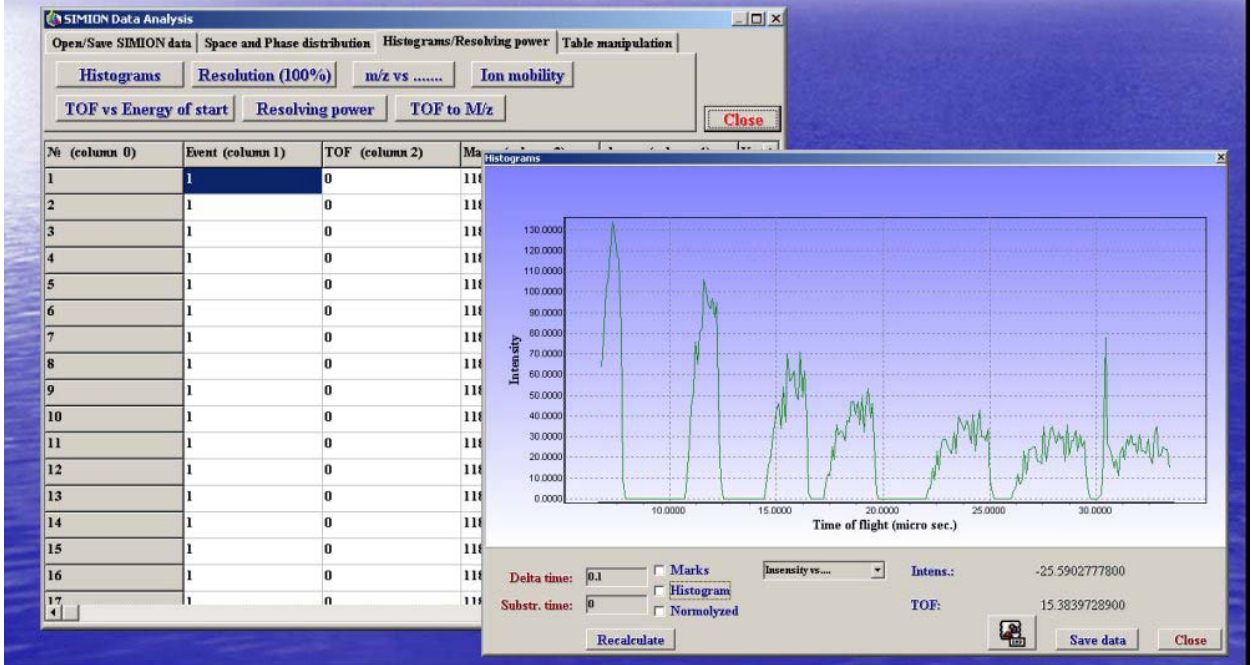
At the bottom, a summary box shows:

- Total number of ions: 6328 100%
- Number of ions in acceptance: 6327 1E2%

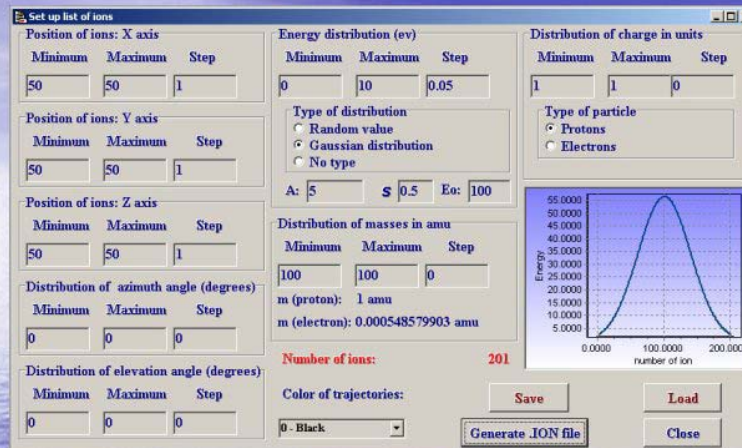
 Buttons for Save data and OK are also present.

Virtual Device provides different types of analysis of simulation results:

1. Creation of histograms (restoring of spectrum from SIMION data).
2. Calculation of resolution and resolving power.
3. Estimation of ion mobility and so on.

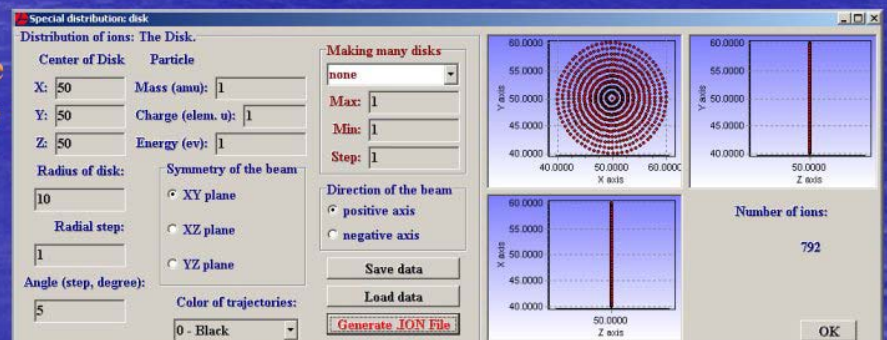


Virtual Device allows quick creation of initial ion distribution for SIMION



It enables creation of initial ion distribution with several types of energy distributions (e.g. Gauss distribution).

By using this feature user is able to create extended sources of ions with multiple initial parameters.



The essential part of Virtual Device is model of ion movement in gas.

This model allows simulating ion movement in gas under influence of electrical field in SIMION.

The screenshot displays the SIMION software interface. On the left, a 3D visualization shows a complex, branching trajectory of an ion in a gas. The main window is titled 'SIMION Data Analysis' and contains a table with the following columns: Ni (column 0), Event (column 1), TOF (column 2), Mass (column 3), charge (column 4), and X. The table contains 18 rows of data. A 'Results' dialog box is open, showing the following values: Ion mobility (in cm²/V^{1/2}sec) in SIMION units: K(over)=0.000240; Ion mobility (in cm²/V^{1/2}sec) in SI unit: K(over)=2.401450.

Ni (column 0)	Event (column 1)	TOF (column 2)	Mass (column 3)	charge (column 4)	X
2	1	0	100	1	50
3	1	0	100	1	50
4	1	0	100	1	50
5	1	0	100	1	50
6	1	0	100		
7	1	0	100		
8	1	0	100		
9	1	0	100		
10	1	0	100		
11	1	0	100		
12	1	0	100		
13	1	0	100		
14	1	0	100		
15	1	0	100		
16	1	0	100		
17	1	0	100	1	50
18	1	0	100	1	40

It includes: 1. A very detailed description of mathematical and physical models. 2. Tests and comparison of models with experimental results and with a theoretical approach. 3. PRG file with a model of collision.



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Welcome to advanced scientific software