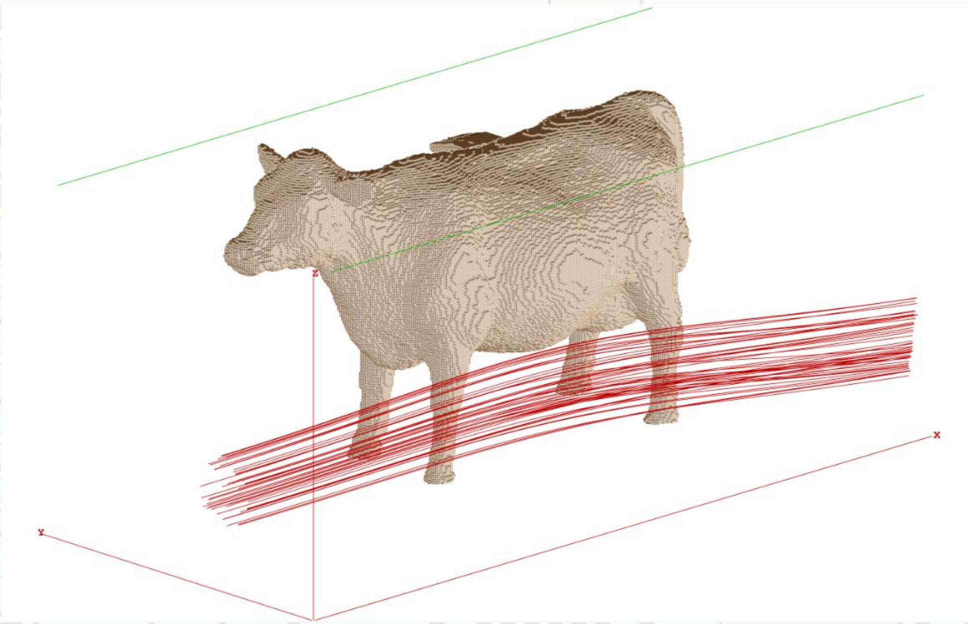
Simion Users Meeting



Talks and experiences exchanges about the Simion Software

11th June 2015 at GANIL (Guest house, Caen)

Contact : Sophie Rastello (sophie.rastello@ganil.fr)

www.simion.com

www.bcp-instruments.com

Why such a day ?

Observation =>

- people from different fields / labs
- need tricks
- different people BUT same tricks
- people don’t aware of tricks

Need exchanges !!

First time

24 contributors

From 12 labs and 2 companies

Covering several Physics / Chemistry fields

Brief history of SIMION

- **The SIMION program originated in Australia in 1973. Don McGilvery created the original SIMION program** while working on an undergraduate research project for Professor James Morrison => **design a double quadrupole mass spectrometer** for isotope ratio measurements

- **70's McGilvery made use of SIMION's RF capabilities** in collaborations with Rick Yost

- **In 1983 Jim Delmore** of the Idaho National Engineeringand Environmental Laboratory (INEEL) obtained a copy of SIMION => **improvements – higher resolution simulations**

- **1985 first task of David A. Dahl** was getting SIMION to run on an IBM AT

- **The first PC version of SIMION was finished in early 1986**, and Jim Delmore was keen on making it available to others. A manual was written and the program was **named SIMION AT version 2.0**

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- **Versions 3.0/3.1**, **released in 1987, had new algorithms to address array refining and ion trajectory calculation issues.**

- **Version 4.0 introduced the significant features of user programming (HP coding system)** and enhanced ion trajectory visualizations. These user programs served to **allow PC SIMION to attack whole new classes of ion simulation problems** (e.g. TOFs, bunchers, quadrupoles, ion traps, and simple FTMS simulations)

- **Version 5.0, created in 1989, was the first tentative step toward a 3D asymmetrical version of PC SIMION**. It was a FORTRAN based program that supported 2D arrays of up to one million points BUT the refine times of classical finite difference algorithms are proportional to the number of array points squared (**the n^2 limitation**) => not formally distributed

- **Skipped point refining methods permitted version 6.0 to support array sizes up to 10 million points**. This was a good match with personal computer capabilities in **1995**; files .PRG file can be used to monitor and control: ion initial conditions, fast adjustable potentials, potentials and gradients, integration time step, ion accelerations, and the ion's state including position, velocity, mass, charge, color, death, and etc

- **Version 7.0** (**2000**), as in previous PC SIMION versions, strives to couple its capability enhancements with the capabilities of the current PC hardware and software. **Thus 7.0 can support 50 million point arrays** (requiring 500 MB of RAM) versus 6.0's maximum of 10 million points.

- **David Manura started around 2004 at Scientific Instrument Services**, introducing 7 SL, 8, 8.1, and 8.2 early access

- **SIMION SL Toolkit** (**2006**)

- **Version 8.0** (**2008**) => **Incorporating Lua programming language**; Increased maximum PA size limit from 50 million (~500MB) **to effectively ~200 million** (~2GB)– or ~300 million (~3GB); Increased maximum number of ions in memory from 500 thousand (~84 MB) to 10 million (~1.7 GB); Now compiling under Visual C++ 2005 (was Visual C++ 6 before). This provides measurably better performance and roughly **~20-40% reductions in run-time from SIMION 7.0**

- ***Tools such as PC SIMION should not be used in blind faith.*** *Just because a few ions manage to get through does not mean the design is acceptable.* ***It is important to understand the physics of the problem and the implications of the chosen simulation***

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D. A. Dahl, "SIMION for the personal computer in reflection," Int. J. Mass Spectrom. 200 (2000) 3

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Objective of the day =>

- exhibit many aspects of SIMION
- encourage trick exchange
- discover the SIMION capabilities
- get organized to last

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Program

Time	Session
09:00	**Welcome Laurent & Pierre**
09:20	*J. Rangama (CIMAP)* *Realtime beam profiles using SIMION and GNUplot*
09:45	*E. Giglio (CIMAP)* *Dirichlet and Neumann boundary conditions in SIMION*
10:10	*P. Salou (Pantechnik)* *SIMION applied to ECR ion sources*
10:35	**Coffe break**
11:00	*J. Bernard (Lyon)* *Ion trajectory simulations for the design of a compact electrostatic ion storage ring : the Mini-Ring*
11:25	*A. Mery (CIMAP)* *TOF spectrometer / multiple-electrode devices*
11:50	*P. Chauveau (GANIL)* *Using Simplex method for ion trap optimization*
12:15	**Lunch Time**
13:30	*E. Traykov (IPHC)* *Ion-atom interactions in a gas jet: coupling of a gas catcher to a linear RFQ cooler*
13:55	*S. Damoy (GANIL)* *Drift field in particle detectors*
14:25	**Discussion - Requests**
15:00	**End**

Many topics = too much information in one day => should keep memory of simple examples

Gather all in the same location for a common access (Simion website?)

A template is available if you wish

Deadline 10 July 2015

This is a trip and tricks document for simion

Chuck Norris
Ganil

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Simion user meeting, GANIL, 11/06/2015

Introduction

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

The same thing

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

To insert equations :

```
\begin{equation}
a + b = \cos \omega x
\end{equation}
```

gives :

$$a + b = \cos \omega x \quad (1)$$

Pictures and tables

To add a figure :

```
\begin{figure}
\centering
\includegraphics[width= 0.4\textwidth]
{Image1.png}
\caption{This is a ion transport simulation.}
\label{figure_vache}
\end{figure}
```

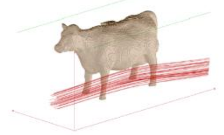

Figure 1: This is a ion transport simulation.

gives a nice figure (see Fig.??). You can also add tables :

Table 1: Example of table

Column 1	Column 2
Une ligne	$\varepsilon_{RMS} = 30\pi$mm.mrad
Rotation θ in °	± 50

by using :

```
\begin{table}[htbp]
  \centering
  \caption{Example of table}
    \begin{tabular}{|l|c|}
    \hline
    Column 1 & Column 2\\
    \hline
    Une ligne &
    $\varepsilon_{RMS} =
    30 \mathrm{\pi mm.mrad}$ \\
    Rotation $\theta$ in $^\circ$ & $\pm 50$ \\
    \hline
    \end{tabular}
  \label{example_de_tableau}
\end{table}
```

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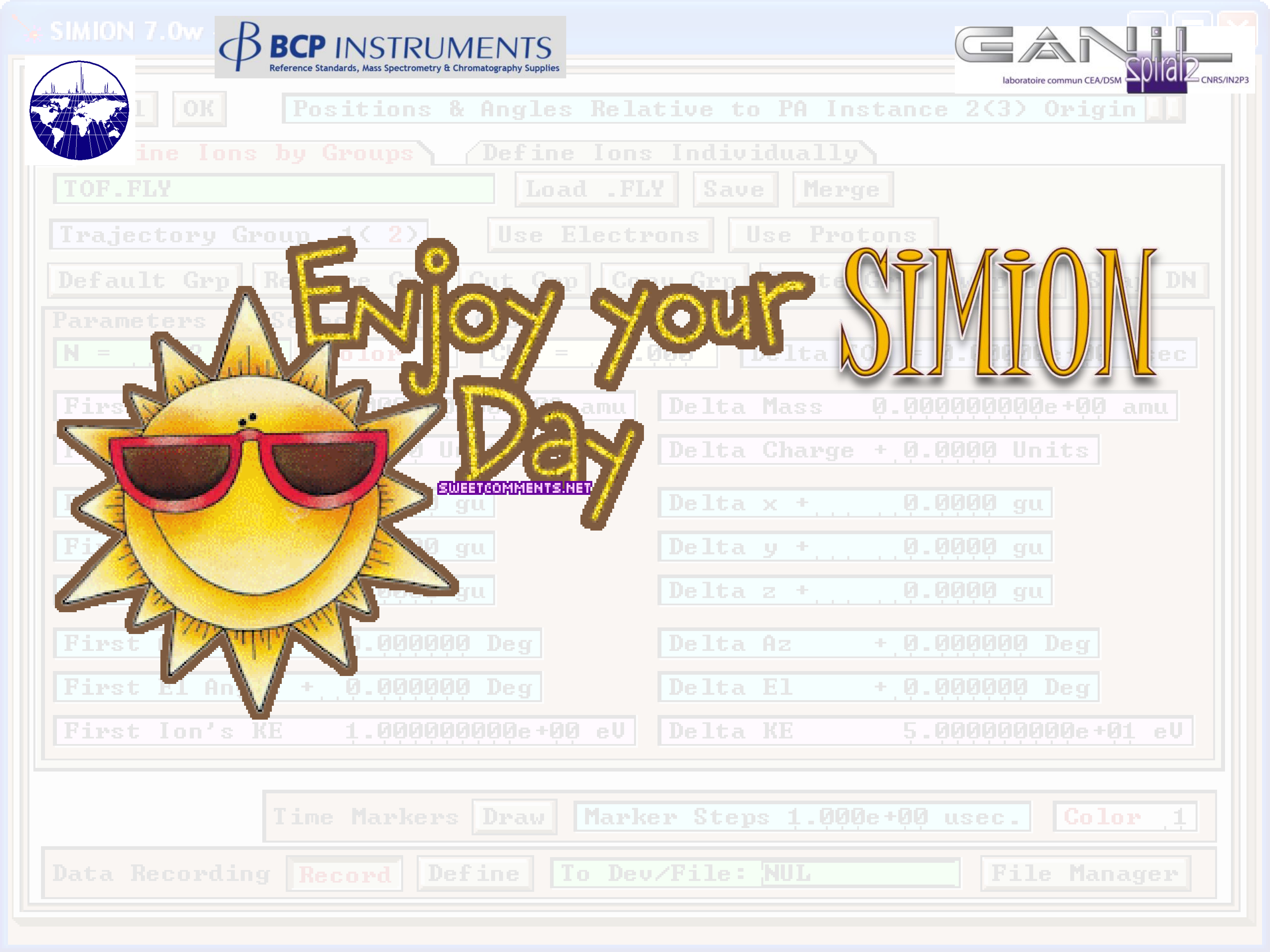
SIMION 7.0w
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Enjoy your Day
SiMION
SWEETCOMMENTS.NET
OK
Positions & Angles Relative to PA Instance 2(3) Origin
Define Ions Individually
TOF.FLY
Load .FLY
Save
Merge
Use Electrons
Use Protons
Default Grp
Delta Mass 0.000000000e+00 amu
Delta Charge + 0.0000 Units
Delta x + 0.0000 gu
Delta y + 0.0000 gu
Delta z + 0.0000 gu
Delta Az + 0.000000 Deg
Delta El + 0.000000 Deg
First El An + 0.000000 Deg
First Ion's KE 1.000000000e+00 eV
Delta KE 5.000000000e+01 eV
Time Markers
Draw
Marker Steps 1.000e+00 usec.
Color 1
Data Recording
Record
Define
To Dev/File: NUL
File Manager