**INTEGRATED**
ENGINEERING SOFTWARE

LORENTZ

Beam Optics and Particle Trajectory Analysis Software

The **LORENTZ** suite of CAE programs covers the full spectrum of beam analysis and particle trajectory applications. It is a specialized tool to simulate particle motion in electric, magnetic and/or high frequency coupled electromagnetic fields. It can perform 2D/Rationally Symmetric and 3D analysis.

LORENTZ is designed to analyze problems faced in charged particle trajectory applications.

Scientists and engineers can depend on **LORENTZ** for the exacting design and analysis of electric and magnetic components that involve charged particles, including:

- **Charged particle trajectories:** ion mobility spectroscopy, ion traps, ion mass and time of flight spectrometers, deflector plates, multipaction, microchannel plates, photomultiplier tubes;

- **Charged particle beams:** electron guns, ion guns, ion implanters, nanotube field emitters, sputtering sources, x-ray tubes, ion propulsion;

- **Beam optics:** focusing electrodes, steering magnets, electron microscopes, multipole beamline magnets.
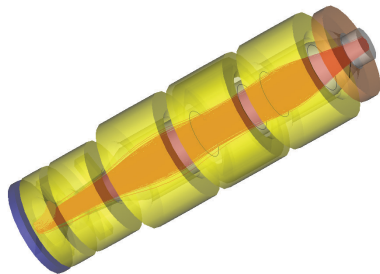
Low Energy Beam Transport (LEBT) system – courtesy of Dr. Sami Hahto
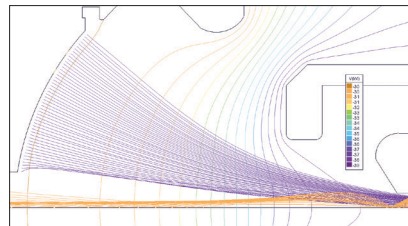
Producing a C- beam by sputtering a C target with Cs+

WE GO BEYOND TRADITIONAL MULTIPHYSICS:

- Metaheuristic approach for optimizing simulation based electromagnetic designs.

- Precise calculation of ion beam trajectories using our proprietary **Boundary Element Method (BEM) solvers**.

- **Finite Element Method (FEM) in addition to BEM.** This hybrid approach uses the strength of each method while designing an electromagnetic system.

- Built in API, Parametric and/or Scripting capabilities

The **INTEGRATED API** enables the direct control of program functions by utility scripts or macros created in tools such as EXCEL or Visual Studio. Scripting can control the entire process of model creation and testing.

- Direct import of models from CAD Partners including: Autodesk, PTC, Solid Edge and SolidWorks.

MORE BENEFITS:

- Easy-to-use and intuitive interface.

- High resolution 3D graphic representations that can show enhanced tracing of points on model.

- Automatic meshing and removal of intersecting geometries.

- World class support team ready to unlock your ideas.

Hybrid Simulation Tools for Electromagnetic and Particle Trajectory Design Analysis

SOFTWARE THAT LIVES UP TO THE POWER OF YOUR IDEAS

3D graph that can show enhanced tracing of points on model

PUT OUR SOFTWARE TO THE TEST

Don't take our word for it.

Contact us for an evaluation and start improving productivity today. Ask for a live demo.
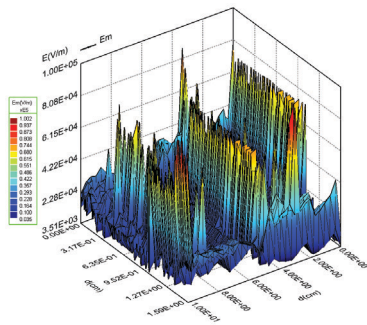
Visualize, Analyze, Optimize

LORENTZ programs come complete and ready to use. No need to purchase additional modules or options; **LORENTZ** is a fully functional CAE tool. A partial list of **LORENTZ** standard features includes:
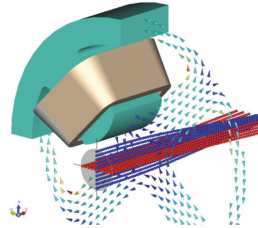
3D Periodic Model of a magnetic quadrupole showing both focusing and defocusing of beams as well as B Field arrows
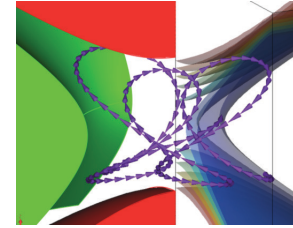
3D Periodic Model of a Penning Trap showing ion trajectory and voltage Isosurfaces Plot

- Parallel processing improves computation speed in proportion to the number of processor cores
- Batch mode, for defining and running unattended solutions
- Calculation of plasma meniscus shape in both 2D and 3D
- Periodic and symmetry features minimize modeling and solution time
- Highly accurate field calculations based on the Boundary Element Method, and Finite Element Method solvers
- High quality graphics and text utility for preparation of reports and presentations
- Capable of handling several current emission regimes, such us Fowler-Nordheim, Child's Law and Richardson-Dushman, among others
- Classical or relativistic modes
- DC or quasitransient electric fields
- Beam analysis enables the user to include the effects of the space charge in the beam
- A variety of field plotting forms including graphs, contour plots and arrow field plots

- Data exportable in formatted files for integration with spreadsheets and other programs
- Powerful parametric feature allows definition of variable parameters to be stepped through, allowing the analysis of multiple "what-if" scenarios and facilitating design optimization
- Particle interaction with gravity, fluid viscosity and particle mobility with wind effects
- Capable of handling multiple emitters, collectors and particle beams
- Statistical treatment of secondary emitters
- Import electric and/or magnetic fields from other simulation software, theoretical predictions or physical measurements
- Space charge can be calculated by element or "tube" methods
- Calculates beam's emittance
- Simulation of more than one hundred thousand rays. User can select to display only certain percentage of these rays.

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