AccelOrator

New PBO Lab™ Beta Releases
PBO Lab 2.1 offers three new Application Modules

AccelSoft is pleased to announce that the PBO Lab 2.1 beta release is now available. This new version supports three new PBO Lab Application Modules:

■ The DECAY-TURTLE Module allows users the ability to trace both the original (Parent) particles and two decay products (Daughters) for radioactive beams. DECAY-TURTLE is a FORTRAN code for simulating the propagation of charged particles through an accelerator beamline or magnetic transport system. It is similar to the TURTLE program in many respects, but includes the additional abilities of particular interest to modeling radioactive beams. Professional versions of both the TURTLE and DECAY-TURTLE Application Modules are available.

Upcoming Conferences

AccelSoft plans to attend the following conferences as an industrial exhibitor. We invite anyone who currently uses our software or who is interested in learning more about our applications to stop by.

■ **16ᵗʰ International Conference on Cyclotrons and Their Applications (CYCLOTRONS 2001)**
East Lansing, Michigan   *12 – 17 May 2001*

■ **2001 Particle Accelerator Conference (PAC2001)**
Chicago, Illinois   *18 – 22 June 2001*

■ **European Conference on Accelerators in Applied Research and Technology (ECAART7)**
Guildford, United Kingdom   *21 – 25 August 2001*

■ **International Conference on Ion Sources (ICIS'01)**
Oakland, California   *3 – 7 September 2001*

■ The Electrostatic Palette Module for the TRACE 3-D Module provides a set of elements for modeling electrostatic lenses and accelerator columns. The Electrostatic Palette includes a number of options for einzel lenses, accelerator columns and gaps, electrostatic prisms, and electrostatic quadrupoles. The electrostatic elements are fully integrated with all the standard TRACE 3-D Magnet and RF elements. The electrostatic elements support 2-D continuous (see Tips, Tricks & Shortcuts on page 3) or 3-D bunched beam calculations, as well as matching and fitting capabilities.

■ The Traveling Wave Accelerator Palette Module for the TRACE 3-D Module provides elements for modeling traveling wave accelerators. The Traveling Wave Palette includes a constant gradient traveling wave accelerator model and a constant impedance traveling wave accelerator model. Beam loading (current) effects on the accelerator gradient and the accelerator structure's beam focusing properties are included in a self-consistent manner. The traveling wave elements are fully integrated with the standard elements of TRACE 3-D and also support matching and fitting.

If you have any questions or are interested in obtaining this new PBO Lab 2.1 beta release, please contact us at accelsoft@ghga.com.

PBO LAB 2.2 WITH OPTIMIZATION MODULE

In addition to the PBO Lab, 2.1 beta version, Accel-Soft is also introducing the PBO Lab 2.2 advanced beta release, which features the new Optimization Module that works with the TRANSPORT and/or TRACE 3-D Application Modules. This latest addition is one of eight modules that are currently available to run with the PBO Lab Basic Package.

The concept behind the Optimization Module was to develop an easy-to-use package where users do not necessarily have to possess knowledge of the detailed I/O required to run individual optimization programs.

Introducing *LIDOS RFQ Designer*™
New version 1.0.1 is now shipping!

The new *LIDOS RFQ Designer* 1.0.1 is now available from AccelSoft or any of our distributors. This software package is especially geared for the design and analysis of radio frequency quadrupole (RFQ) accelerators.

The *LIDOS RFQ Designer* contains three different modules or levels: (1) Advisor, (2) Modeler, and (3) Simulator. Here are some of the specifics on each of these components of the software:

■ The "Advisor," or *RFQ Designer Level 1 Advisor*, allows the user to make preliminary data analysis and to calculate the main parameters. Features of the "Advisor" include the following capabilities:

⇒ To set linac parameters

⇒ To plot variations of intervane voltage, synchronous phase, bore radius, and modulation factor

⇒ To calculate cell lengths

⇒ To simulate beam motion in the frame of ideal RF approximation

⇒ To estimate RF losses in copper and RF supply parameters

■ The "Modeler," or *RFQ Designer Level 2 Modeler*, generates parameters for real vane shape descriptions. In addition, this level also allows the user to find the input beam optimal size and convergence.

■ Finally, the "Simulator," or *RFQ Designer Level 3 Simulator*, allows the user to simulate beam motion while taking into account the real vane shape, gaps between cavity sections, fringe fields, Crandall cell, etc.

The *LIDOS RFQ Designer* is a Windows-based application that includes an advanced version of the RFQ module of the original *LIDOS Advisor*, but also allows for additional RFQ design and analysis capabilities. This new program is available in both a Standard and a Professional version. Please contact AccelSoft directly for more information on this new package.

PBO LAB 2.2 WITH OPTIMIZATION MODULE

(Continued from page 1)

Instead, optimization problems are set up and executed graphically using intuitive GUI components.

The Optimization Module features GUI components and other software elements from three optimization programs: LSSOL, NPSOL, and MINOS. LSSOL is a constrained linear least-squares and quadratic optimization program. NPSOL and MINOS are both constrained nonlinear optimization programs, but the two packages use different approaches and are applied to different types of optimization problems.

Any input parameter to an optics code can be declared as an Optimization Module variable. Output parameters from the optics codes can be defined as store parameters. The store parameters may then be used to formulate the nonlinear constraints and/or merit functions for NPSOL or MINOS. More than one optics code may be included in a problem, and hierarchical problems can be formulated using the fitting/optimization capabilities of the optics codes inside the Optimization Module.

Please contact AccelSoft at accelsoft@ghga.com for more information on this PBO Lab Application Module. We'll be happy to answer any specific questions.

Tech Support & Product Update Service Info

As a reminder to all of our current software users, AccelSoft offers a **Technical Support & Product Update Service** (TS&PUS) that includes the following:

■ 48-hour response (in most cases) to emailed requests for technical support

■ Upgrades and updates that are sent to the user automatically

■ Early access to beta releases

■ Very reasonable annual fee, especially if the service is ordered within 30 days of expiration of the current TS&PUS agreement. *This renewal fee can also be applied toward the purchase of new Modules or Palettes.*

Please note: For AccelSoft customers whose Tech Support & Product Update Service has *expired for more than twelve months*, the cost to renew this service will be 40% of the product's current list price. Of course, this service is included free for one year with any initial purchase. Please contact us for renewal pricing or for more information on updating your software support agreement.

Tips, Tricks & Shortcuts
Modeling High Current Continuous (DC) Beams

AccelSoft™

The new ElectroStatic Palette Module that is available for the PBO Lab 2.1 TRACE 3-D Module is often used for simulating the performance of direct current (DC), or *continuous* beams. However, the TRACE 3-D space charge routine models bunched beams, rather than continuous beams. In order to simulate DC beams with high space charge using TRACE 3-D, the PBO Lab Beam Piece has an option available to use an *effective* bunched beam current that, in conjuction with the longitudinal phase space parameters, allows TRACE 3-D to simulate a DC beam.

The figures below illustrate the four basic steps in setting up the PBO Lab Beam Piece so that the space charge calculation in TRACE 3-D is appropriate to DC beams. Users interested in the details underlying this capability of PBO Lab can refer to a paper presented at the 1998 LINAC conference: "Optics Elements for Modeling Electrostatic Lenses and Accelerator Components: IV. Electrostatic Quadrupoles and Space Charge Modeling," Proceedings of the XIX International Linear Accelerator Conference, Volume 2, pages 848-850 (1998). (A copy of this paper may be downloaded from the AccelSoft web site at www.ghga.com/accelsoft.)
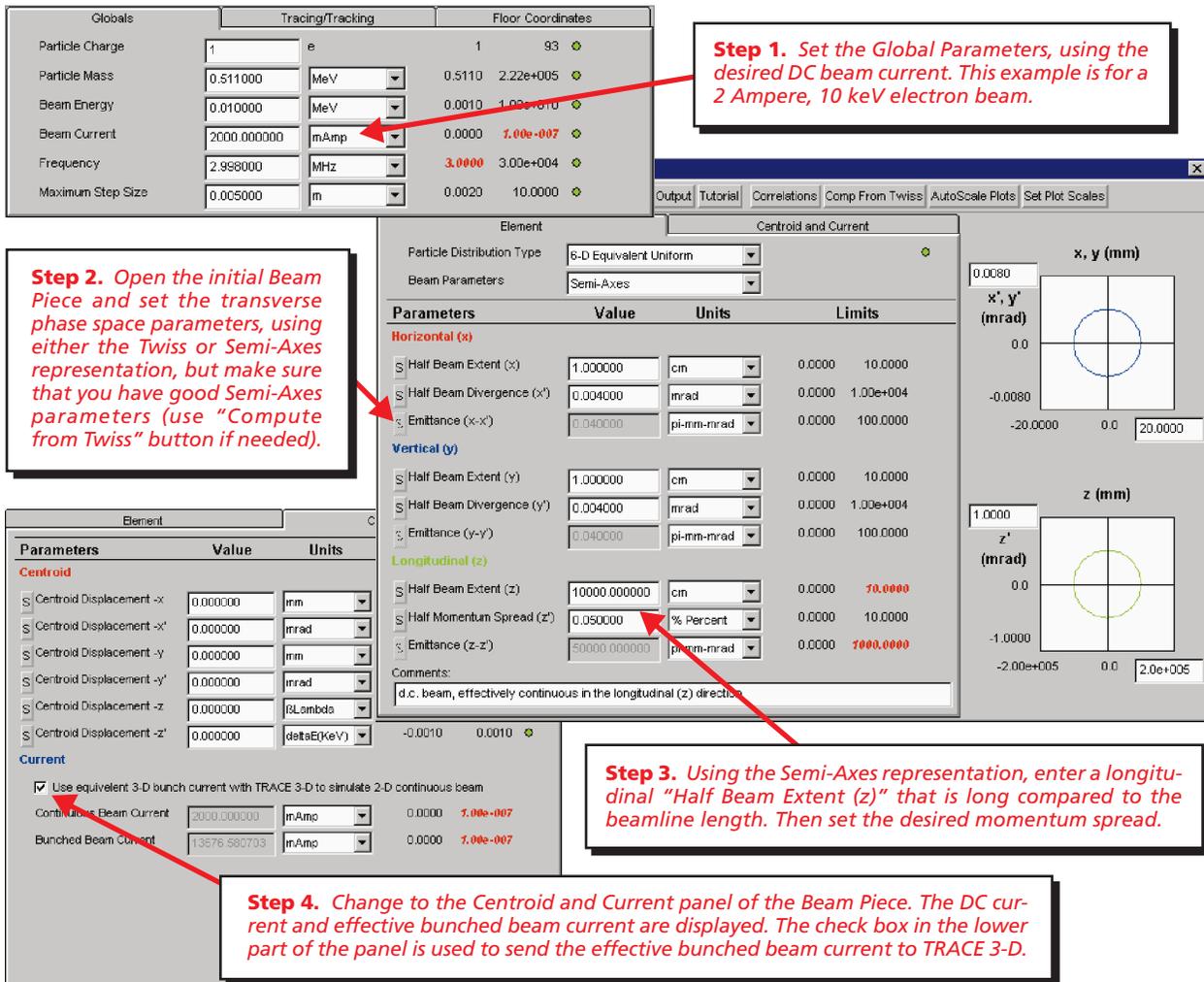
Step 1. *Set the Global Parameters, using the desired DC beam current. This example is for a 2 Ampere, 10 keV electron beam.*

Step 2. *Open the initial Beam Piece and set the transverse phase space parameters, using either the Twiss or Semi-Axes representation, but make sure that you have good Semi-Axes parameters (use "Compute from Twiss" button if needed).*

Step 3. *Using the Semi-Axes representation, enter a longitudinal "Half Beam Extent (z)" that is long compared to the beamline length. Then set the desired momentum spread.*

Step 4. *Change to the Centroid and Current panel of the Beam Piece. The DC current and effective bunched beam current are displayed. The check box in the lower part of the panel is used to send the effective bunched beam current to TRACE 3-D.*

★ ★ ★ ★ ★ ★ ★ U.S. PARTICLE ACCELERATOR SCHOOL NEWS FLASH ★ ★ ★ ★ ★ ★ ★

AccelSoft is happy to report that for the third year in a row, the U.S. Particle Accelerator School incorporated PBO Lab into one of its courses. During the USPAS January 15 - 26, 2001 session held at Rice University in Houston, Texas, Michael Syphers of Fermilab was the instructor for the undergraduate Accelerator Fundamentals class where Elvin Harms, also of Fermilab, oversaw the computer lab for the two-week course. Mr. Syphers and Mr. Harms, both long-time PBO Lab users, integrated the use of PBO Lab into the course content. In fact, in a call from Mr. Harms following the class, he reported that the students found PBO Lab to be extremely useful as an educational aid. The next USPAS session is scheduled to meet June 4 - 15, 2001, at the University of Colorado at Boulder.

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For data on current product offerings and other information, contact AccelSoft directly or through your distributor:
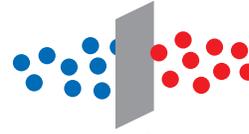
In Japan, South Korea and Taiwan:

ADVANCED ELECTRONICS TECHNOLOGY

email: info@aetjapan.co.jp
TEL: 044-9669981 FAX: 044-9511572

In Member States of the European Union:

PAC sprl

email: info@pac.be
TEL: +32 10 24 70 77 FAX: +32 10 24 72 20

www.ghga.com/accelsoft

AccelSoft™

P.O. Box 2813
Del Mar CA 92014