



PBO Lab™ 3.0.1 Update Released

New Features and User Requested Capabilities Added

■ Particle Beam Optics Laboratory 3.0.1 Update

An important upgrade to PBO Lab 3.0 will begin shipping next month. The new release features several enhancements and improvements requested by users. PBO Lab 3.0.1 will be automatically shipped to all users whose Technical Support and Product Update Service (TS&PUS) is current. If your TS&PUS has expired and you wish to receive this new release please contact us via email (accelsoft@ghga.com) and include your PBO Lab license number.

Some examples of the new features in PBO Lab 3.0.1 for popular application modules are summarized below.

● Optimization Module Enhancements.

The default bounds for numerous Optimizer Variables now reflect important physical limitations. Bounds on PBO Lab Optimizer Variables provide one way to specify constraints on beamline parameters for nonlinear, constrained, optimization problems. For parameters selected as Optimizer Variables that should remain positive (e.g. emittances, beam sizes, etc.) the *default* lower bound has been set to a small positive number (1.0e-10). Similarly, beam correlation parameters (off diagonal reduced sigma matrix), which should have a magnitude of less than unity, have *default* lower and upper bounds set to -0.999999 and +0.999999, respectively. The changes only apply to the *default* bounds of certain Optimizer Variables to aid in the rapid

initial set up of optimization problems. Users may always assign their own bounds, and utilize other linear or nonlinear constraints, for any Optimizer Variable.

● TRACE 3-D Module Enhancements.

Support has been added to utilize Wiggler Piece parameters as TRACE 3-D match (i.e vary) or couple parameters. The Wiggler Piece parameters may now also be used as Optimizer Variables for nonlinear, constrained, optimization problems with the PBO Lab Optimization Module.

● Additional Enhancements.

PBO Lab 3.0.1 has several enhancements to other Modules, as well as some new custom Modules. The second page of this AccelOrator Newsletter describes some of these additional enhancements. The new Modules described there are “helper” Modules developed to support other PBO Lab Modules. While technically beta releases, any PBO Lab user whose TS&PUS is current should feel free to request any “helper” Module that supports their PBO Lab configuration.

● Bug Fixes and Other Features.

A few bugs reported by users have been fixed in PBO Lab 3.0.1. Some new features that have been requested by users are also included in the release. The Release Notes file distributed on the CD with version 3.0.1 provides a summary of these bug fixes and other features.

Upcoming Events and Other News

■ 21st International Conference on the Applications of Accelerators in Research and Industry (CAARI 2010)

Ft. Worth, Texas: 8 August - 15 August 2010

We invite our customers and AccelOrator readers to meet members of the AccelSoft staff and to use the opportunity to ask questions, offer suggestions, and learn more about our software. Please visit our CAARI exhibit booth.



*** ACCELERATOR NEWS BULLETIN ***

The U.S. Particle Accelerator School (USPAS) will be using PBO Lab in the following January 2011 course:

Course Title: Fundamentals of Proton Linear Accelerators with Simulation Lab
Instructors: John Staples, George Gillespie, Sang-Ho Kim

Location/Dates: Old Dominion University January 17-28
Web: <http://uspas.fnal.gov/programs2/2011/odu>

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New Specialized PBO Lab 3.0 Modules Available

Developed with the Open Architecture Software Integration System™



■ DST-Converter Module

A specialized Module has been developed to convert particle distribution files from one format to another. The DST-Converter Module concentrates on generating 6-D particle distributions that can be utilized by the TURTLE, MARYLIE and PARMILA-2A Modules for multi particle simulation. This Module was created using the OASIS™ Module Builder. OASIS is the Open Architecture Software Integration System for PBO Lab, which was developed as part of a U. S. Department of Energy Small Business Innovative Research (SBIR) effort. The OASIS Module Builder is itself a PBO Lab Module that can be utilized by users to develop their own custom Modules for PBO Lab 3.0.

The DST-Converter Module was developed so that a particle distribution file generated by one beam optics program (the “input” distribution file) can be used to create a corresponding set of particle distribution files (the “output” distribution files) for each optics program that is supported in the suite of PBO Lab Application Modules. From a given input particle distribution file, the DST-Converter Module will generate text and/or binary output particle distribution files for use by TURTLE, MARYLIE and PARMILA-2A, all in a single calculation. The DST-Converter Module handles all units conversions, any required file header data, nonlinear coordinate transformations, and other details that make distribution file conversions difficult.

The input particle distribution can come from three PBO Lab Module programs (TURTLE, MARYLIE or PARMILA-2A) or from another external program that generates particle distribution files. The DST-Converter Module requires either the TURTLE, MARYLIE or PARMILA-2A Modules.

■ PARMILA-2A Module

An alternate Module to the original PBO Lab 3.0 PARMILA-2 Module has been developed. The Module was developed in order to address problems identified by users in the compiled physics code for the original PARMILA-2 Module. Like the original PARMILA-2 Module this alternate Module was created with the OASIS Module Builder and has been given the beta release name of PARMILA-2A Module. (The “A” standing for “alternate” module.)

One reason for the development of the PARMILA-2A Module was to support the reading of different input particle distribution files. The original compiled physics code for the PARMILA-2 Module can only read proprietary formatted binary particle distribution files, such as those written by particular versions of the RFQ code PARMTEQ. When used in conjunction with the DST-Converter Module, the PARMILA-2A Module can utilize particle distribution data from other programs like ion source codes and other RFQ codes.

The PARMILA-2A Module can be run side-by-side in PBO Lab with the original PARMILA-2 Module. This permits direct comparisons of accelerator design results and other calculations for testing. The PARMILA-2A Module requires the PARMILA-2 Module.

■ ATMG Modules

Selected Automatic Transfer Map Generator (ATMG) Modules have been further developed. The ATMG Modules are utilized to readily generate particle transfer maps and transfer matrices from magnetic or electrostatic field data. The ATMG Modules require the MARYLIE Module, and are also useful with the TRANSPORT and TURTLE Modules.

For data on current product offerings and other information, contact AccelSoft directly or through your distributor:

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