

Spect3D

user's guide

Revision History

Version 15.0.0

SPECT3D:

- Support has been added for an updated version of Prism's Atomic Database (ver. 7.0.0). The new database features:
 - The database incorporates NIST atomic data version 5.0 (2016)
 - Added consistency for modeling He- and Li-like satellite transitions.
 - Corrected possible problems with collisional rates that would result in excessive ionization when high-n states are included in the calculations.
 - Default atm files for K-shell emission now use fine structure level of description for both population and spectral calculations.
- The x-ray scattering backlighter option is no longer available for cases with the *Single-Cell* plasma specification (see *Simulation Type* widget). When performing x-ray scattering calculations for simple grids with a single volume element, the grids should be generated with the *PlasmaGEN* application.
- X-ray Thompson scattering calculations will now run faster for the RPA model (and somewhat for the Static-LFC model). This is accomplished by caching results from an inner function in the X-ray scattering library, which tends to get called many times with the same input parameters. A conservative caching tolerance of 1% is used (which is determined to have negligible effects on the results), leading to an increased speed of 2-10x, depending on plasma conditions.
- The X-Ray source (for X-ray Thompson scattering) table input, for user-defined X-Ray source spectra, now responds to the magnitude of the table values. Though while the shape of the scattered spectrum is correct, the absolute units may not be correct.
- After completing a *SPECT3D* simulation, users are now provided the option of launch *SpectraPLOT* (a new tool for visualizing *SPECT3D* results).
- For the *LOS-Grid Intersection Model* (see *Simulation Type* widget), the *Load Entire Spatial Grid* option is no longer available. The *Individual Elements* method, which is more robust and computationally efficient, now works for all geometries.
- Option to perform multi-threaded calculations for "short characteristics" method has been implemented.
- License agreement for *SPECT3D* was updated. Please read new terms and conditions carefully.
- Users with activated-based licensure may now *deactivate* their license, in order to use that license seat on a different computer instead. The option is located under License Manager in the Help menu.
- Bug fixes:
 - Fixed crashes when an unsupported element is present in the target when using XRTS. Added new elements: Mg, Ti, Ta. Current list of elements for xrts models is: H, D, He, Li, Be, B, C, N, O, Mg, Al, Si, Ar, Ti, Fe, Cu, Br, Xe, Ta, Au.
 - Various issues with tables have been fixed, including unexpected clearing of bad user-entered data when sorting and saving.
 - A check added to verify if an external radiation source is turned on and has data when it is used as a backlighter.
 - Prevented crashes for cases when no level is selected in singly ionized species.
 - Fixed non-physical ionization distributions in the cases of very strong ionization potential depression (mostly EK model).
 - Fixed possible inconsistencies in the simulations that use single-group (gray) opacity files.
 - Fixed crash which sometimes occurs when deleting detectors.
 - Now allowed to choose model for population solution when using non-local radiation transport in a steady-state simulation (i.e., using Multi-angle long [or short] characteristics).
 - Fixed possible crashes when using transition modifiers for time-dependent simulations.

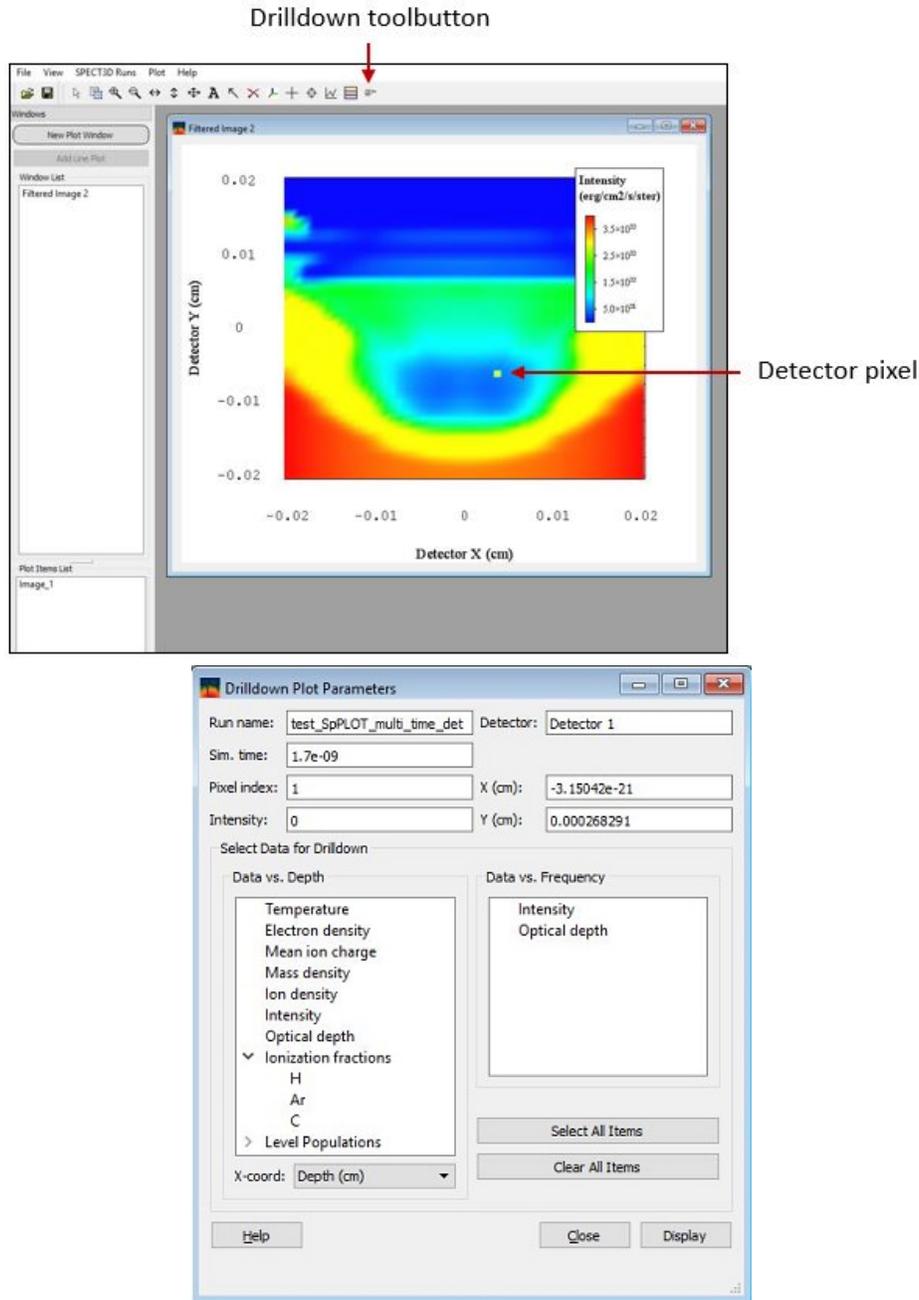
VISUALIZER:

- Bug fixes:
 - Fixed crash that sometimes occurs in drilldown plots for some geometries

SpectraPLOT:

- The *Main Window* has been revised to provide for a more intuitive use.
 - Displaying new plot windows and adding line plots to existing windows is now done using buttons located in the upper left portion of the *Main Window*.
 - A list of *Plot Items* for the active *Plot Window* is now shown in the left panel of the *Main Window*. (e.g., the line plots of a *Spectrum* plot window). To edit the properties of a plot item, double-click on the item.
 - Printing images is now supported. To do this, select the *File | Print Image* menu item.
 - Additional details are provided in the *SpectraPLOT* documentation.
- *SpectraPLOT* now uses an updated version of Prism's plot library, which is designed to support a wider variety of 2-D and 3-D plot surfaces.

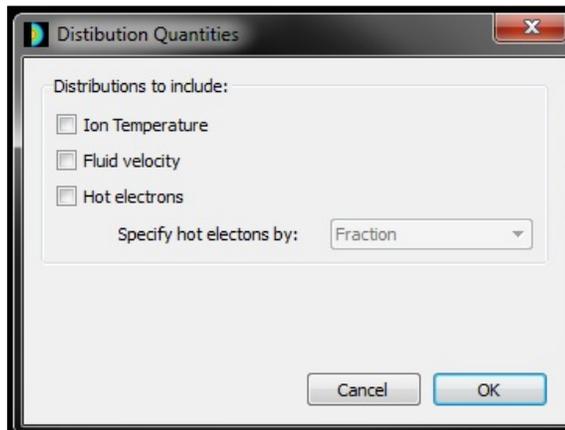
- Drilldown is now supported in *SpectraPLOT*. This is done by clicking the *Drilldown* toolbutton, and then picking a pixel in an Image plot window.



- The ability to plot radial intensity lineouts for circular detectors is now supported.
- The ability to show lineouts from contour plots has been added.
- Changed Gaussian time gates to use Gaussian weight functions of amplitude 1, rather than of normalized integral, in order to behave the same way as the square gate.
- Bug fixes:
 - Fixed "array out of bounds" error when using partial detectors.

PlasmaGridGenerator 4.3.6:

- Zero-area volume elements for 2D-RZ geometries are no longer written to NetCDF files.
- Add "Ion Temperature" as a distribution quantity. Once checked, users are able to define ion temperature distribution, distribution data is contained in the exported netcdf file.



- Built with updated compilers and dynamic libraries.
- Bug Fixes:
 - When generating pseudo-3D grid for EXODUS files (for 2D geometries), a minimum number of nodes is now enforced, forcing sensible results and avoiding a crash when exporting. This minimum is 2 nodes for Cartesian, and 1 node for Cylindrical.
 - Minor bug fixes.

GridConvert 2.1.2:

- Built with updated compilers and dynamic libraries.
- Bug Fixes:
 - Various issues with tables have been fixed, including unexpected clearing of bad user-entered data when sorting and saving.
 - Minor bug fixes.