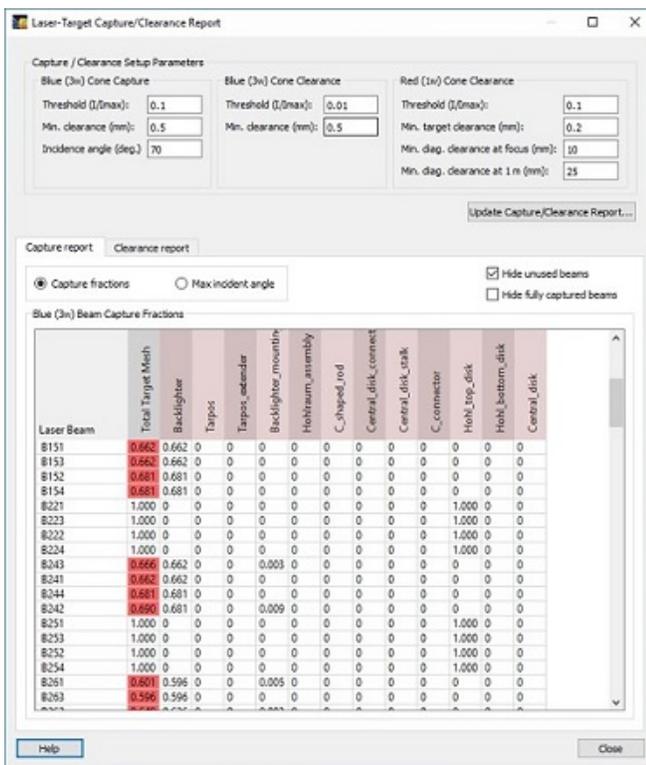# Revisions for VISRAD 15.0.0

- A report showing which laser beams are fully captured by the target grid can now be generated using the *Laser Beam Capture Report*. To generate a report, select the *Lasers | Capture/Clearance Assessment*, or click on the ⬐ tool button.

  A laser beam cone is considered to be fully captured by the target grid if both the "boundary" of the beam cone is fully contained within the target grid and it hits the target surface at an incident angle which is less than a specified allowed maximum. The beam cone is given an enhanced radius to ensure a that minimum clearance is maintained.

  In performing laser beam <u>capture</u> calculations, only *Target Components* are considered in the calculation. *Chamber Components* are ignored. Also, calculations are performed only for blue (3ω) cones; for NIF, calculations are not supported for red (1ω) and green (2ω) cones.

  The beam capture report contains two tables: one containing the beam "capture fraction", the other containing the maximum allowed incidence angle.
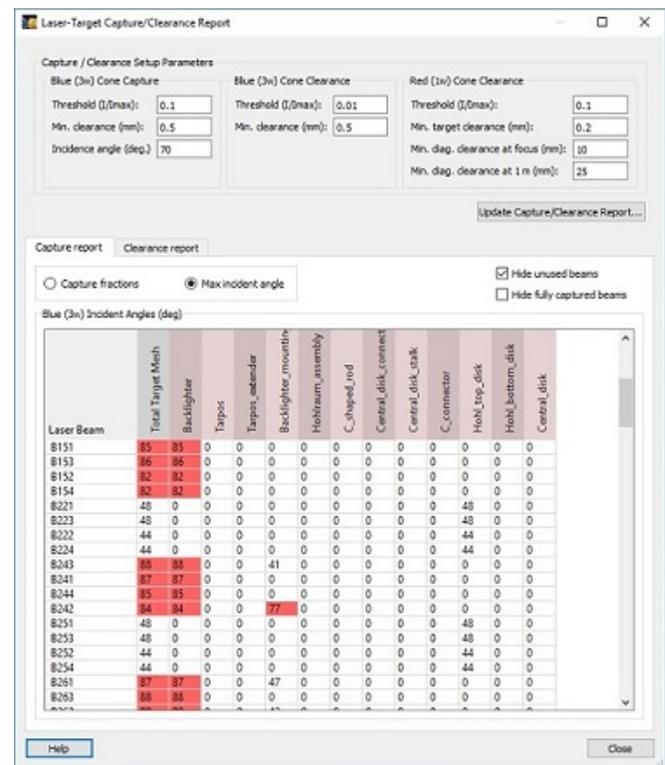

  The capture fraction is the fraction of test rays that are incident on the grid of *Target Components* (see table above, left). For each beam cone, a grid of rays extends from the laser beam final optic toward the beam focus. The intersection of each ray with the target grid is then computed, and the number of hits on each *Target Component* is tallied. The fraction of rays hitting each target component is shown in the table, as well as the total for the target mesh. If the capture fraction for the total mesh is less than one, the result is highlighted.

  For each ray hitting a surface element of a *Target Component*, the angle with respect to the surface normal is computed. The maximum angle recorded for each *Target Component* is then reported in the incident angle table (see table above, right). If the maximum incident angle exceeds the value specified by the user, the result is highlighted.

- A report showing which laser beams clear *Target Components* and *Chamber Components* can now be generated using the *Laser Beam Clearance Report*. To generate a report, select the *Lasers | Capture/Clearance Assessment*, or click on the ⬐

tool button.

A laser beam cone is considered to clear a *Target Component* (or *Chamber Component*) if none of its surface elements is contained within a cone test volume which is specified using: (1) the intensity threshold (I/I_{max}), which is used to define the outer radius of the beam cone, and (2) a minimum clearance, which is the amount by which the cone radius is expanded

For each laser beam cone, all *Target Components* and *Chamber Components* are checked to see if any of their surface elements lie within the test volume. If any surface elements lie within the test volume, the component fails the clearance test. The beam clearance report contains a table showing, for each beam cone, which *Target Components* and which *Chamber Components* are either cleared (shown as green) or not cleared (shown as red). This allows users to easily see which items fail the clearance test for each beam.
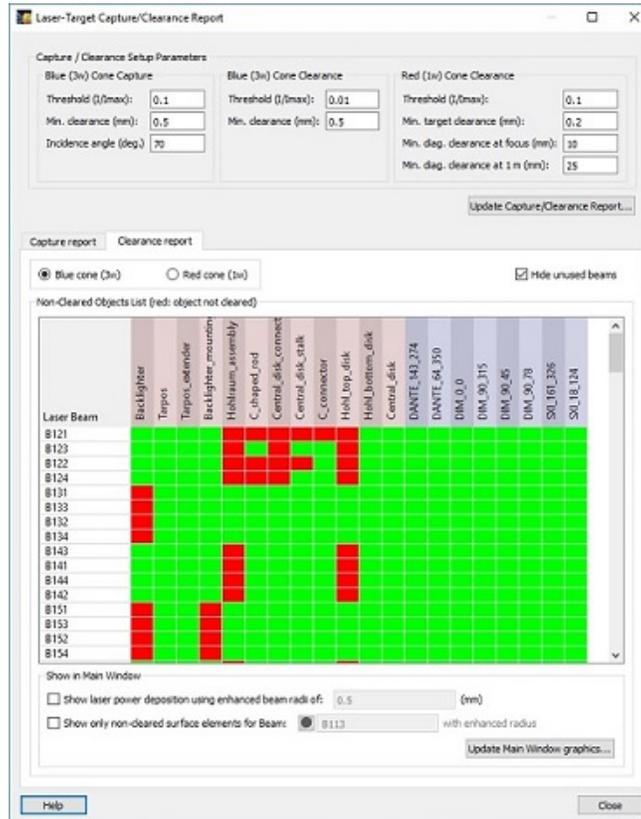
Input for the blue (3ω) clearance calculations include the intensity threshold to use in defining the outer radius of the cone test volume, and the amount by which the test cone radius is enhanced. This enhancement to the cone radius is applied along the entire length (*z*-axis) of the cone.

For red (1ω) clearance calculations (for NIF), separate clearance parameters are applied to *Target Components* and *Chamber Components*. For the value specified for *Target Components*, the enhancement applied to the test volume is constant along the cone axis. For *Chamber Components*, the enhancement to the radius varies linearly with *z* (*i.e.*, the distance from the focus). In this case, the clearance is specified using two parameters:

- the minimum diagnostics clearance at focus, and
- the minimum diagnostics clearance at 1 meter.

Additional parameters that affect the cone test volume are the number of angular (*i.e.*, azimuthal) points, and the number of points along the *z*-direction (see the *Lasers* tab in [Setting Preferences](#)).

Additional information regarding beam clearance can be obtained using the check boxes at the bottom of the *Laser Beam Clearance Report*. The laser power deposition intensity on the target grid (*i.e.*, *Target Components* only) can be shown in the *Main Window*, where the radius of each beam's intensity profile is enhanced by a specified amount. (If the enhanced radius is zero, the results are the same as obtained when selecting the *Display | Direct Laser Power Deposited*.)

Also in the *Main Window*, the surface elements of *Target Components* and *Chamber Components* that lie within the cone test volume of a specified laser beam can be displayed. To do this, check the box, and click on the *Update Main Window Graphics* button.

- When importing CAD files, the following changes have been made:
  - When importing, the surface fill mode (which affects its visual appearance) is set to *Use Default*. By doing this, the fill mode of imported objects now respond to the value selected for the *Show | Surfaces As* menu items, and their associated tool button (, ,).
  - When importing a STEP-formatted CAD file as *Target Components*:
    - individual CAD objects (or CAD "shapes") are separated into individual *Target Components*.
    - the new components are given separate colors, and placed in a folder with the name of the imported file.
    - the names of the individual components are given by the imported file name (truncated, if necessary), and appended with a number.
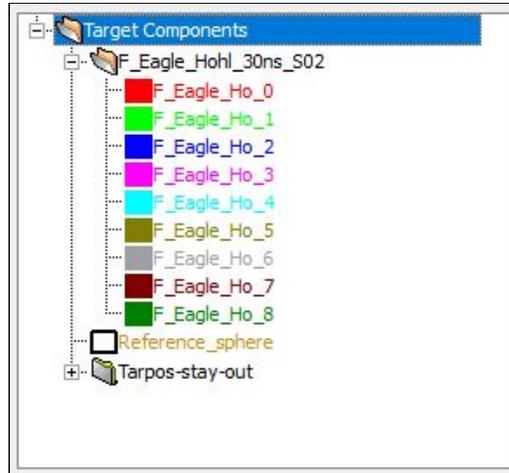
  - When importing a STEP-formatted CAD file as a *Chamber Component*:
   - individual CAD objects (or CAD "shapes") are separated into items within a single *Chamber Component*.
    - each item is given a separate color, and placed in the *Chamber Component*, whose name is given by the imported file
    - the names of the individual items are truncated, and appended with a number.
- *Chamber Components List*: An icon now appears to the left of each chamber component name. Its appearance signifies the following:
  - Color and filled: Chamber component is included in laser beam clearance calculations; it is shown in the main window.
  - Color and open: Chamber component is included in laser beam clearance calculations; it is hidden in the main window.
  - Black and filled: Chamber component is not included in laser beam clearance calculations; it is shown in the main window.
  - Black and open: Chamber component is not included in laser beam clearance calculations; it is hidden in the main window.
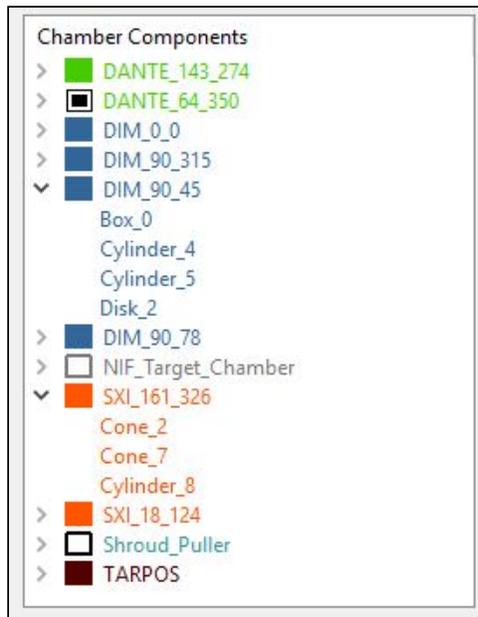
- NIF Target Chamber: The TanDM348 has been added to the list of available *Target Mounts*.
- *Chamber Components Library*: when importing *Chamber Components* from the library, the components are now always shown, even if they were hidden when saved to the library.
- OMEGA *X-TVS/Y-TVS Viewer*:
  - When exporting reticle data to XML-formatted files, the reticle name is now defined using "ret_name", and leading zeros have been dropped for reticle position and ellipse angle orientation variables.
  - When exporting 1-bit N/W views, the *Wide* view now correctly exports 2248x2248 pixel images.
- *Surface of Revolution* object: Updates have been added to support specifying the *z*-dependent *Surface of Revolution* radius using a table of *r* and *z* values. At each node of the surface, the radius is computed by interpolating using the node's *z*-position.
- *Object Parameters Dialog*, *Size/Gridding* tab: The text of check boxes used to specify time-dependent grid sizes has been changed from *Variable* to *Time-Dep.* For *Surface of Revolution* objects, the check box is used to supply *r(z)* values.
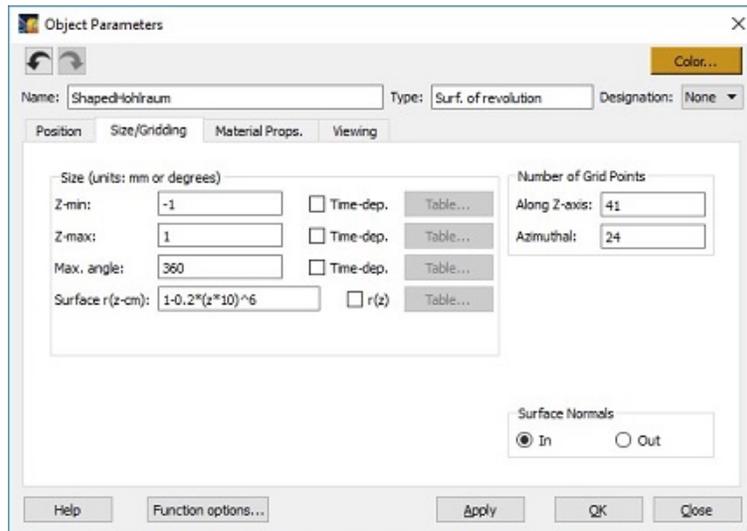
- *Chamber Components List*: Support has been added to set the color of *Chamber Components* or any of their items. To do this, right-click on one or more items in the *Chamber Components List*, and select the *Set Color* menu item.
- When displaying *Cutaway Views* in the *Main Graphics Window*, negative offsets can now be used.
- *Laser Beam Parameters Dialog*: On the *Properties* tab, for "fixed beams" (*i.e.*, non-Custom beams), the port position boxes were changed from "disabled" to "read only". This allows users to copy port angles and paste them into other edit boxes.

- 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. A button is available for online deactivation. Alternatively, manual deactivation is available via email contact with Prism.

- Bug fixes:
  - OMEGA SG5 Phase Plate: the spot size ("Major radius at best focus") was changed to its correct $1/e$ value (357 um).
  - A bug that occurred when copying *Target Components* with *Clipping Volumes* from one workspace to another using drag/drop has been fixed. The bug occurred when the name of the reference coordinate system for the *Clipping Volume* (*i.e.*, one of the *Target Components* being copied) was changed due to a name clash with a previously existing *Target Component*.
  - Upgrades were made to ensure the names of *Chamber Components* are unique.
  - In *Laser Beam Parameters Dialog*, *Energetics* tab, fixed crash that occurred when selecting a *Laser Beam Cluster* item, when attempting to copy tabular time-dependent laser beam powers to or from another beam *(i.e.*, using the *Copy Table From* or *Copy Table To* buttons in the *Laser Beam Power* dialog used when the beam energetics that are *Variable* (time-dependent)). Also, when copying table values from a selected *Laser Beam*, if no table values exist for that beam, the user is notified.
  - In *Object Parameters Dialog*, fixed problem of multiple warning messages occurring while using *Orientation Angle* sliders when unallowed parameters were entered for *Target Components*.
  - For *Generalized Mesh* objects, on the *Size/Gridding* tab of the *Object Parameters* dialog, the node position limits are now given in the default units specified in user *Preferences* (*User Interface* tab).
  - Issues with tables have been resolved, including the following:
    - Pasting copied cells will no longer cause a crash when copying beyond the current number of cells in the table. Instead, more cells are added.
    - Invalid input no longer leads to surprise table clearing when using the *Sort X*, *OK*, *Apply*, and *Copy To/From* buttons. Either a warning will appear, or the user will be asked to fix their table before proceeding. "Invalid input" includes non-number cell entries, and rows with missing X or Y entries.
    - Plotting table data also now requires all row entries to be valid, rather than silently ignoring invalid rows/cells.
    - Inserting and deleting rows no longer produces erroneous row numbering on the left side.
  - In the list of available chamber components for OMEGA EP, TPS and TPS_2 are renamed to TPS_7 and TPS_83 respectively.