

# Import IES and LDT Photometric Data to TracePro

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## Requirements

**Models:** None

**Properties:** rayfile\_LA\_CN5M\_20170227\_IES.ies

**Editions:** TracePro LC, Standard or Expert

## Introduction

TracePro's IES/LDT Plot feature helps users import photometric data in IES or LDT standard electronic file formats to generate TracePro File Sources and Surface Source Properties. This utility is for use with all TracePro editions.

The IES/LDT Plot is accessed in TracePro by selecting **Tools | IES/LDT Plots**.

## IES Standard File Format

The Illuminating Engineering Society (IES) publishes "IESNA Standard File Format for the Electronic Transfer of Photometric Data and Related Information." The most recent publication, LM-63-02, was ANSI approved September 12, 2002. The TracePro IES Import Utility adheres to this most recently published standard. For a detailed description of all file data, please refer to the copyrighted published standard.

The IES/LDT Plot tool supports Photometric Type A, B and C. Refer to IESNA-75-01 for a detailed explanation of goniometer types.

## Modeling Sources with TracePro

TracePro is a comprehensive, versatile software tool for modeling the propagation of light in opto-mechanical systems. Models are created by importing design files from a lens design program or a CAD program or by directly creating the solid geometry in TracePro. Optical and mechanical properties are applied to materials and surfaces. Source rays propagate through the model with portions of the flux of each ray allocated for absorption, specular reflection and transmission, phosphorescence, and scattering.

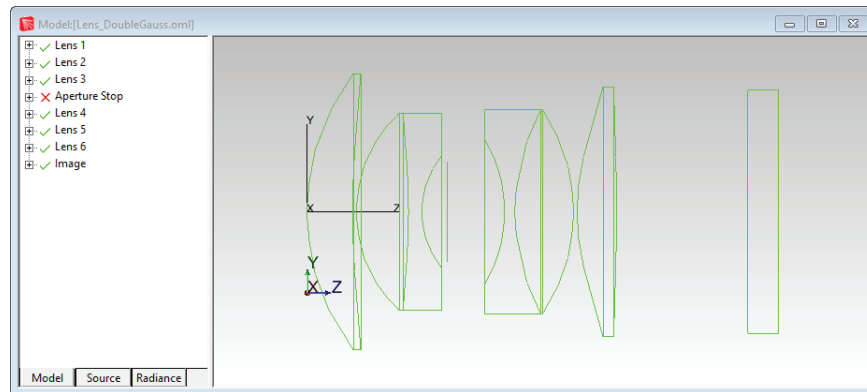
From the model, analyze:

- Light distributions in illumination and imaging systems
- Lumens exiting, absorbing, and incident at the component and system levels
- Candela distributions
- Optical efficiency, luminance and radiance metrics
- Luminance effects and lit appearance
- Fluorescence effects of phosphors

## Modeling Optical Sources in TracePro

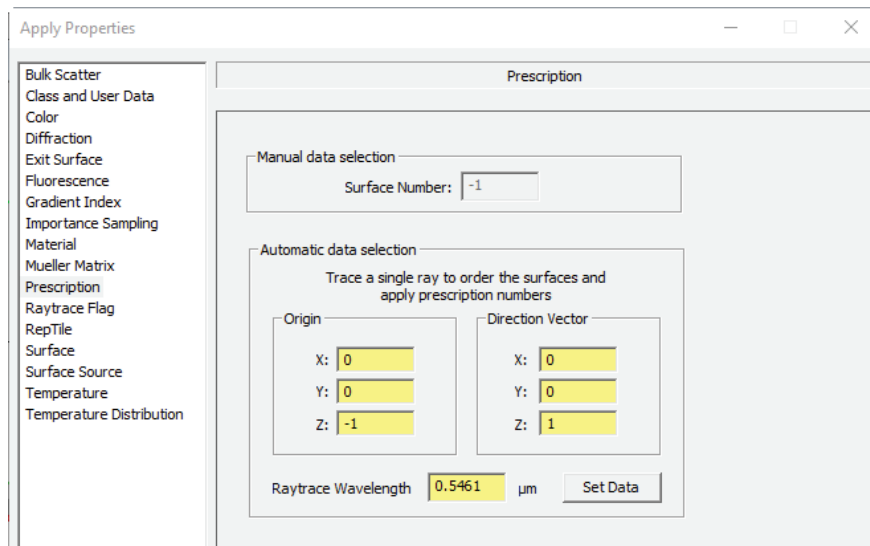
There are three methods of defining rays that launch into the model for ray trace – Grid, Surface and File sources. Most useful for modeling LEDs and lamps for commercial lighting applications are Surface Sources and File Sources.

A Surface Source emits rays from a user-defined source type in an angular distribution and spectrum from one or more surfaces of a solid object. The example that follows makes use of the Surface Source method of defining rays that launch into the model for ray trace.



A File Source uses a ray file that contains ray data and can be inserted into a TracePro model. Data consists of XYZ starting points for each ray, XYZ direction vectors for each ray, and a flux. A File Source allows the user to:

- include actual measured source distribution data from companies offering LED or lamp characterization services
- include properties from IES files



## TracePro IES/LDT Plot Feature

### IES File

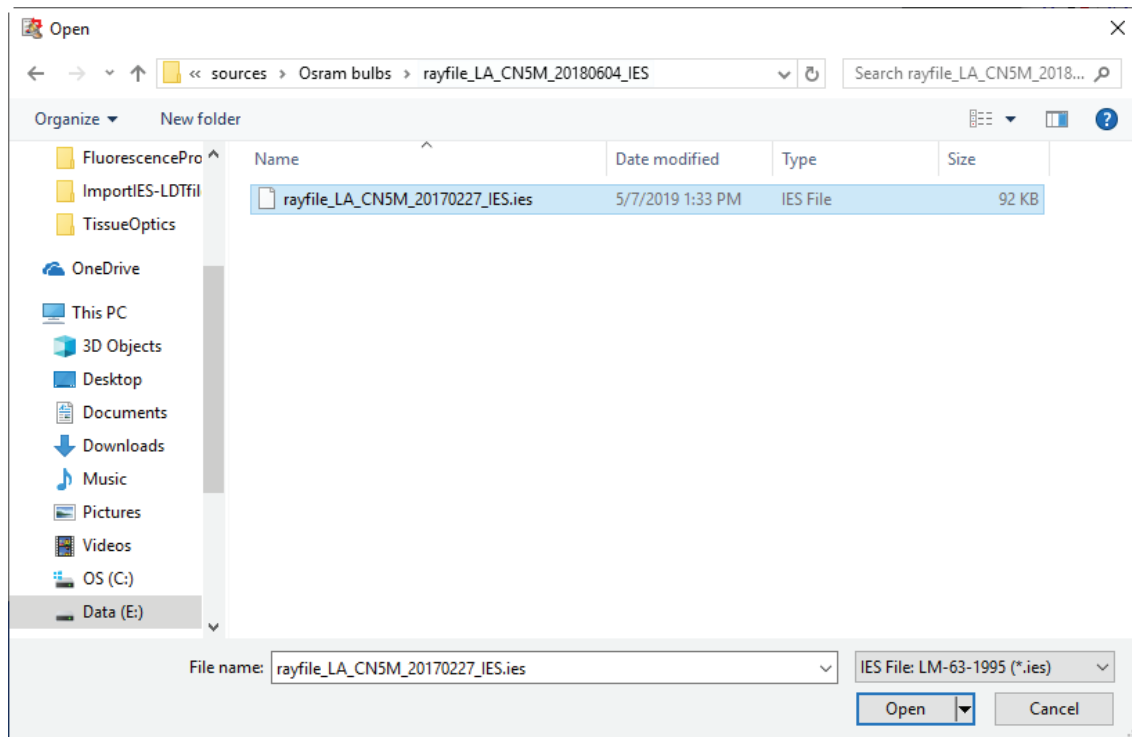
With the IES/LDT Plot feature, specifications from an IES file can be directly exported to a Surface Source Property or ray file and used in an open TracePro model. Contents of the IES file that export to TracePro source models include:

- Source output as a function of luminaire tilt angle
- Number of sources and lumens per source
- Candela value multiplier
- Number of vertical and horizontal angles
- Photometric Type B or Type C
- Dimensions, shape, and units of luminous area or volume
- Input watts
- Vertical and horizontal angles
- Candela values for vertical and horizontal angles

### User Interface

The IES/LDT Plot feature enables you to:

- Open an IES or LDT File
- Analyze the file using plots and viewers
- See a 3D view of the data
- Compare to industry lighting standards
- Analyze Illuminance
- Export the data as a Surface Source Property or TracePro ray file.



IES/LDT Plot user interface

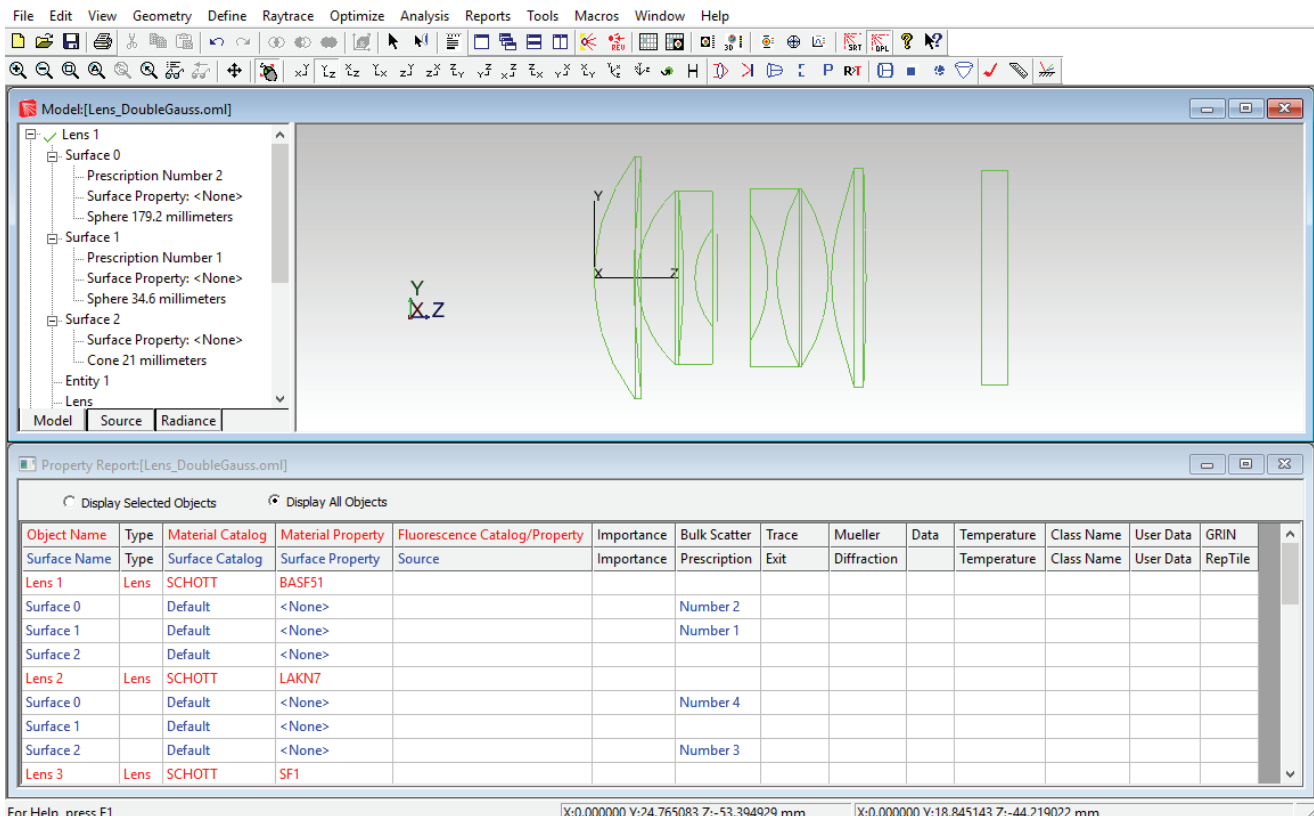
### Import IES File

To import an IES file, select File | Open. As an example, browse and load the file, rayfile\_LA\_CN5M\_20170227\_IES.ies. When loaded, the data from the IES file is displayed in the 3-D Viewer and the IES/LDT Source Information window.

#### 3-D Viewer

Options for viewing the source are accessible with a right mouse click on the 3-D Viewer window. Additional features for viewing include:

- Mouse wheel to zoom in and zoom out
- Left mouse button + mouse move to rotate view
- Alt + mouse left button + mouse move to translate view
- Double click left mouse bottom to move the viewing center to origin



3-D Viewer

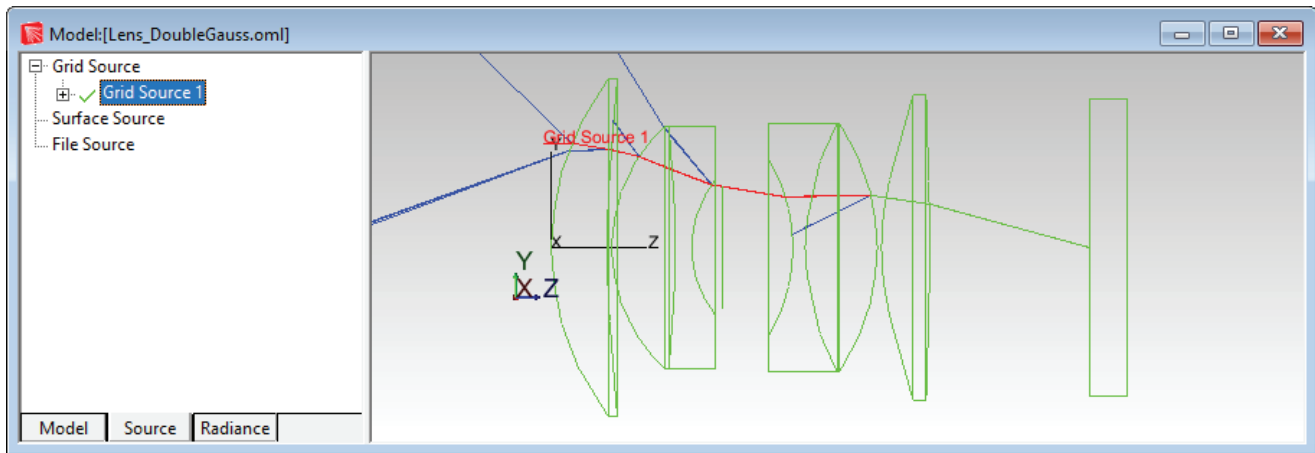
### Export to TracePro

The IES/LDT tool exports to either a TracePro Surface Source Property or a TracePro ray file.

#### Export to TracePro Surface Source Property

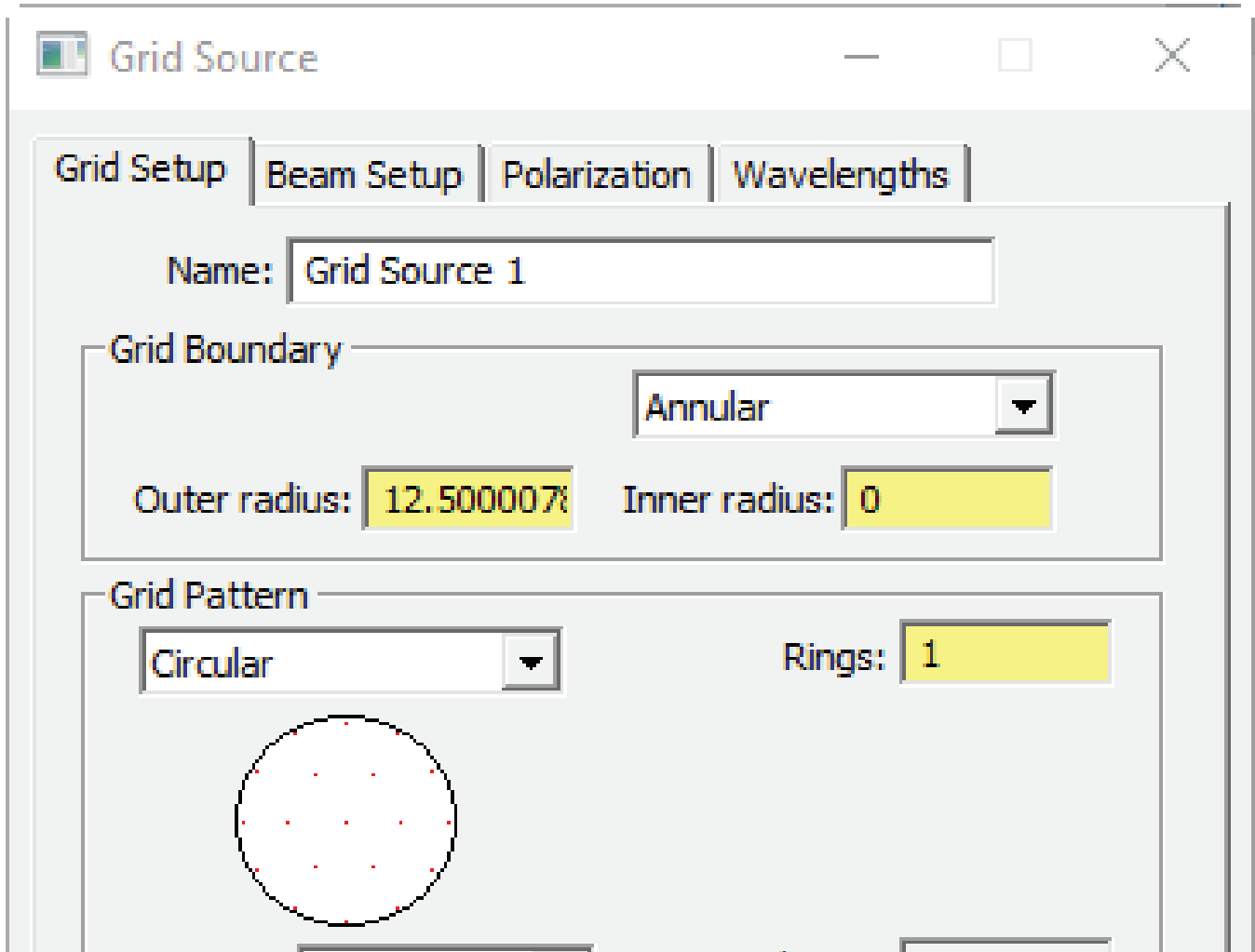
The IES/LDT tool exports a TracePro Surface Source Property. As an example, select File | Export and select Surface Source Property as the Source type.

Select Export and specify the location and name of the saved TracePro Surface Source Property \*.txt file.



Surface Source Property Export

The Surface Source Property text file can be opened in a Text Editor application.



TracePro \*.txt Surface Source Property file

To import the Surface Source Property in TracePro, select **Define | Edit Property Data | Surface Source Properties** to open the Surface Source Property Editor. Then select **File | Import** to import the property text file.

The screenshot displays the TracePro software interface. The top menu bar includes File, Edit, View, Define, Raytrace, Optimize, Analysis, Reports, Tools, Macros, Window, and Help. Below the menu is a toolbar with various icons for file operations, navigation, and analysis. The main window shows a 3D model of a lens system with a coordinate system (X, Y, Z) and a ray path. The left sidebar contains a tree view of the model's components, including Surface Property, Cone 21 millimeters, Entity 1, Lens, Material from SCHOTT, Material name BASF51, Lens 2, Lens 3, Aperture Stop, Surface 0, Entity 4, Lens Data From OSLO, Lens 4, and Lens 5. The bottom panel shows the Incident Ray Table for Aperture Stop Surface 0, with a 'Send to Analysis Toolkit' button.

Ray Number	Wavelength	Source	Start Ray	Ray Node	Type	History	Flux	X Pos.	Y Pos.	Z Pos.	X Vec.	Y Vec.
1	0.48613	Grid Source 1	1	8	SpecTran		0.736226	0	0.0474821	21.38	0	0.60963
2	0.58756	Grid Source 1	2	8	SpecTran		0.748552	0	0.0087807	21.38	0	0.60681
3	0.65627	Grid Source 1	3	8	SpecTran		0.751856	0	-0.008178	21.38	0	0.60554

For Help, press F1

X:0.000000 Y:24.765083 Z:-53.394929 mm

X:0.000000 Y:-23.948850 Z:-14.709022 mm

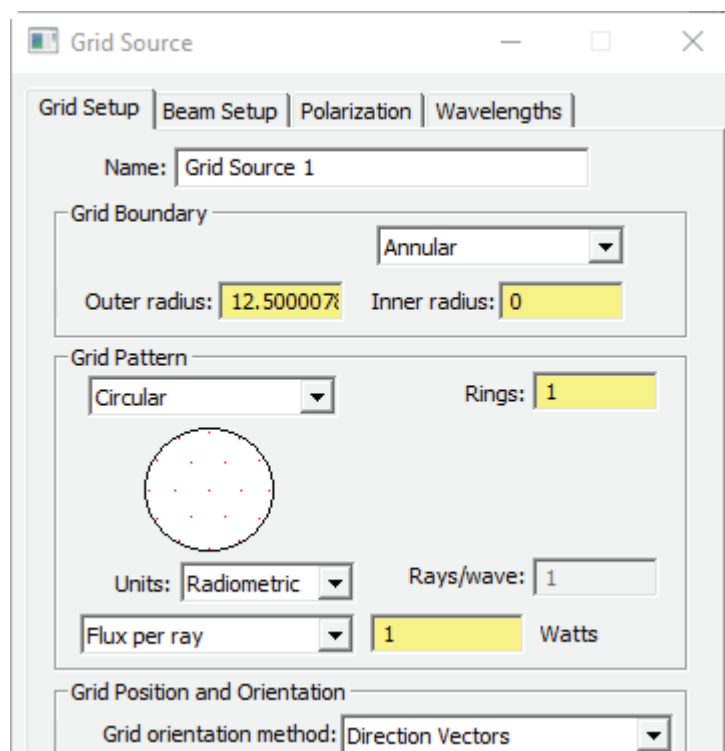
## Export to TracePro File Source

The IES/LDT Plot tool exports to a TracePro ray file. The *Source normal vector*, *Source up vector* and *Source area* data fields are used to generate the ray information. The IES/LDT tool randomly generates the origins of rays within the specified source area. Each ray direction is determined by the IES file and the normal vector and up vector of the source. After the ray file is generated, it is possible to modify the source position and direction in the TracePro model.

The tool accommodates two options to make the far field measurement similar to the distribution defined in the IES file - Uniform flux and Uniform angle.

When Uniform flux is selected, each ray carries equal flux, but it is possible that the angular distribution is weighted over the angles defined in the IES file. When Uniform angle is selected, each ray carries a different and weighted flux, but the distribution is uniformly distributed over angle.

As an example, select *File Source* as the *Source type*. Select *Uniform flux* for *Mode*. Select *Export* and specify location and name of the saved TracePro \*.txt file.



Ray file Export with uniform flux, weighted angle



Automatic Setup of Importance Sampling

Target Shape  Annular  Rectangular

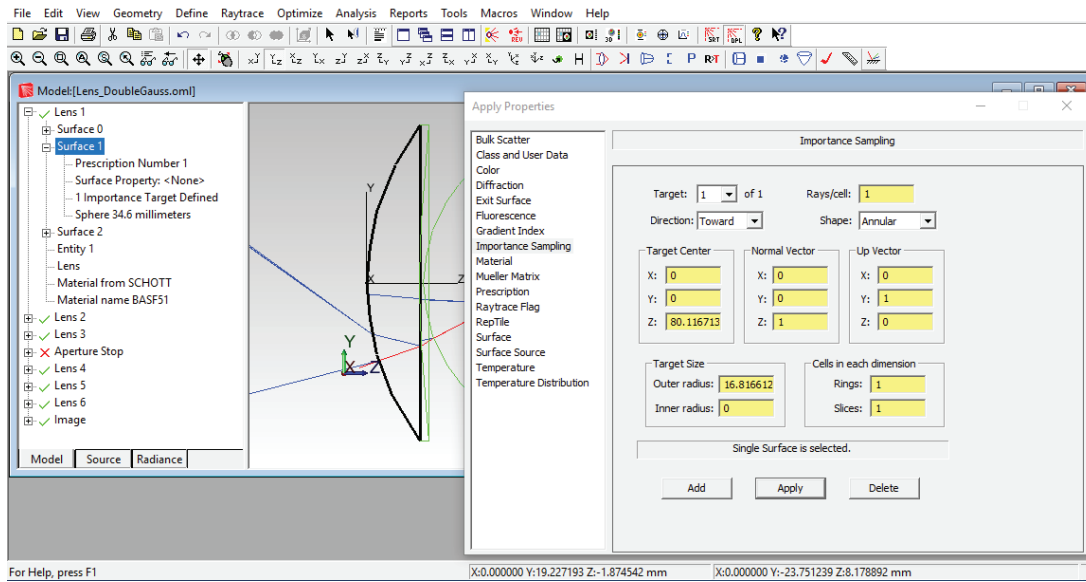
	Gut Ray	Marginal Ray	Outer Ray	Inner Ray
X position:	0	0	0	0
Y position:	0	13	-11.25	0
Z position:	-1	-1	-1	0
X direction:	0	0	0	0
Y direction:	0	0	.37	0
Z direction:	1	1	1	1

Raytrace Wavelength 0.5461  $\mu\text{m}$

OK Cancel Save

Ray file Export with uniform angle, weighted flux.

The ray file can be opened in a text editor application.



TracePro \*.txt File Source Property file

To insert the ray file into a TracePro model, select **Define | File Source**. Then enter a name for the source and browse to the Ray File. Enter Center Position and Rotation to locate and orient the source.

Type in a wavelength and click Add, and finally click Insert to create the File Source.

