Luminance Map Example

Requirements

Models: Luminance_GlassSphereOnCheckerboard.oml
Luminance_GlassSphereOnRed-WhiteCheckerboard.oml

Properties: Luminance_GlassSphereOnCheckerboard_Properties.txt
Luminance_GlassSphereOnRed-WhiteCheckerboard_Properties.txt

Editions: TracePro LC, Standard and Expert

Introduction

The following example is based on a simple model constructed for the purpose of demonstrating the Luminance Map feature. The geometrical model consists of a glass ball resting on the surface of a back-and-white checkerboard. Two sides of the checkerboard (those furthest from the eye point) are backed by gray walls. A Silhouette view of the geometry of the model is shown in Figure 1. For a rendered view, select **View|Render** as shown in Figure 2. The model consists of a sphere made of glass (Schott BK7) with no surface property, resting on a checkerboard consisting of alternating black and white squares. The black squares have the Default:Black Paint property (reflectance of 10%), and the white squares have Lambertian:Diffuse White property. These properties are spectrally flat. The back walls have the property Default:19% gray, which is Lambertian with reflectance 19%. The large tilted square is the lone light source in the model.

To begin, open the model "Luminance_GlassSphereOnCheckerboard.oml" and import the properties by selecting **Tools|Database>Import** and importing the file "Luminance_GlassSphereOnCheckerboard_Properties.txt." If prompted to overwrite properties, click "Yes to all".
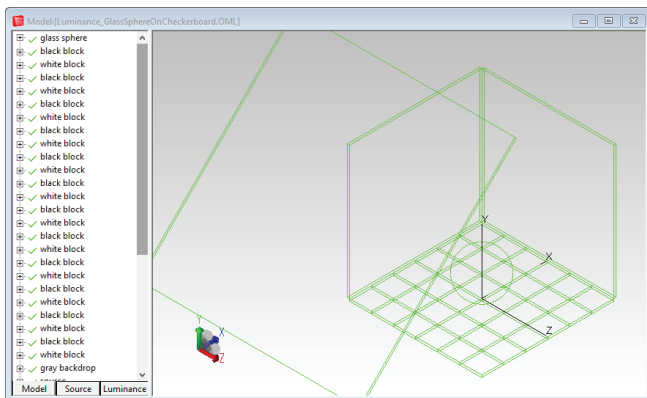

Figure 1. Silhouette view of the model "Luminance_GlassSphereOnCheckerboard.oml"
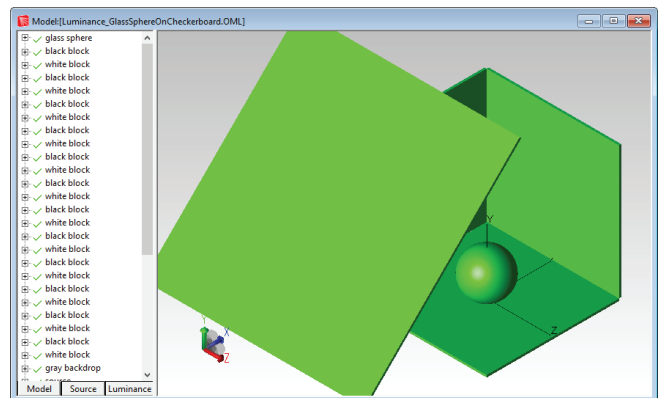

Figure 2. Rendered view of the model "Luminance_GlassSphereOnCheckerboard.oml"

The Luminance Map data is already defined for this model. To see the data, choose the Luminance tab in the system tree, right-click in the tree on image1, then select **Define Luminance** and see the dialog box shown in Figure 3.

The Quality is set to High in the saved file. To get a result more quickly, change Quality to Low to decrease the raytrace time. To make this change, select Low for the Quality, then click "Modify".
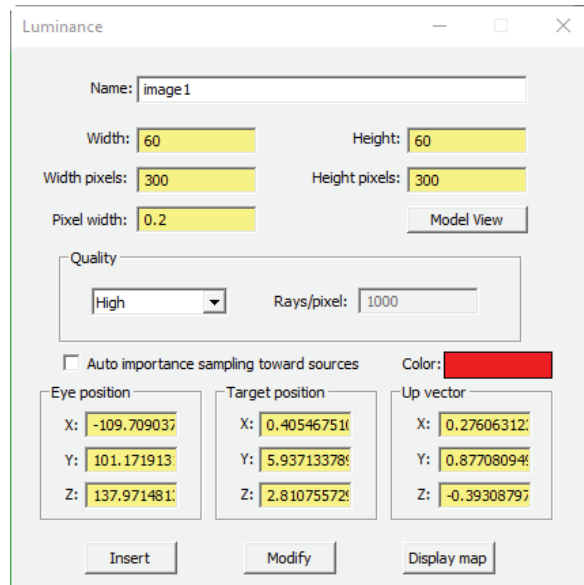
Select Raytrace|TraceLuminance/Radiance to trace the rays.

Figure 3. Luminance settings for the ""Luminance_ GlassSphereOnCheckerboard" example.

After the rays have been traced, click on the Display Map button to view the map. The default map option is for a Grayscale gradient. Select **Analysis|Luminance-Radiance Map Options** to change the color to False Color (rainbow), then click Apply.
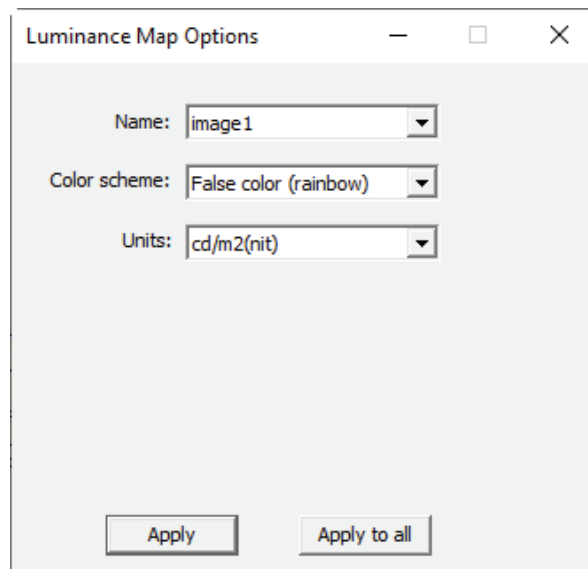

Figure 4. Luminance Map Options dialog

The result of each of the Color Scheme selections in the *Luminance Map* Options dialog box is shown in Figure 5 through Figure 10. These images are the result of the High Quality Luminance calculation, your results will differ if you ran the faster, Low Quality option.
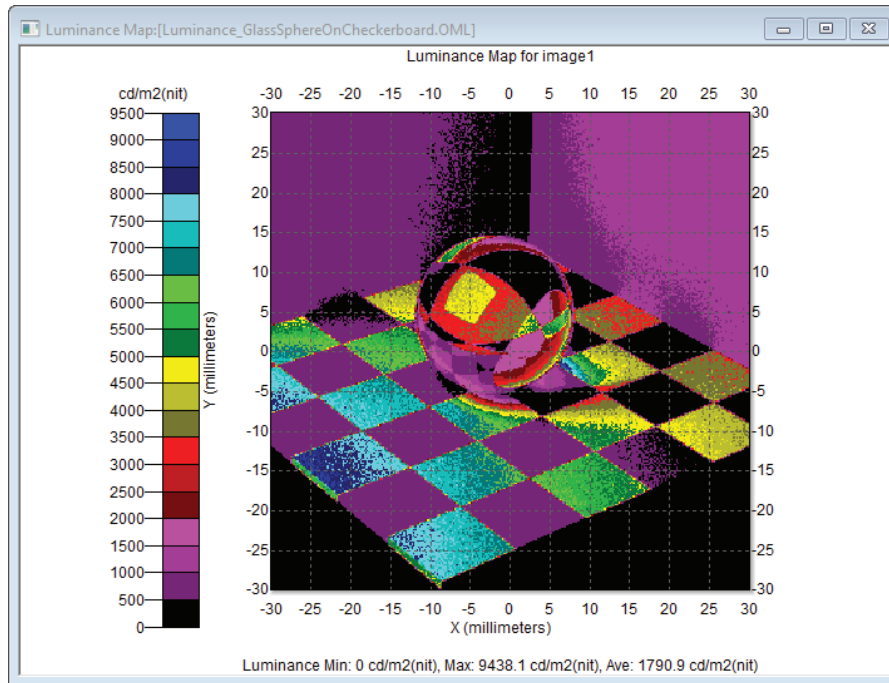

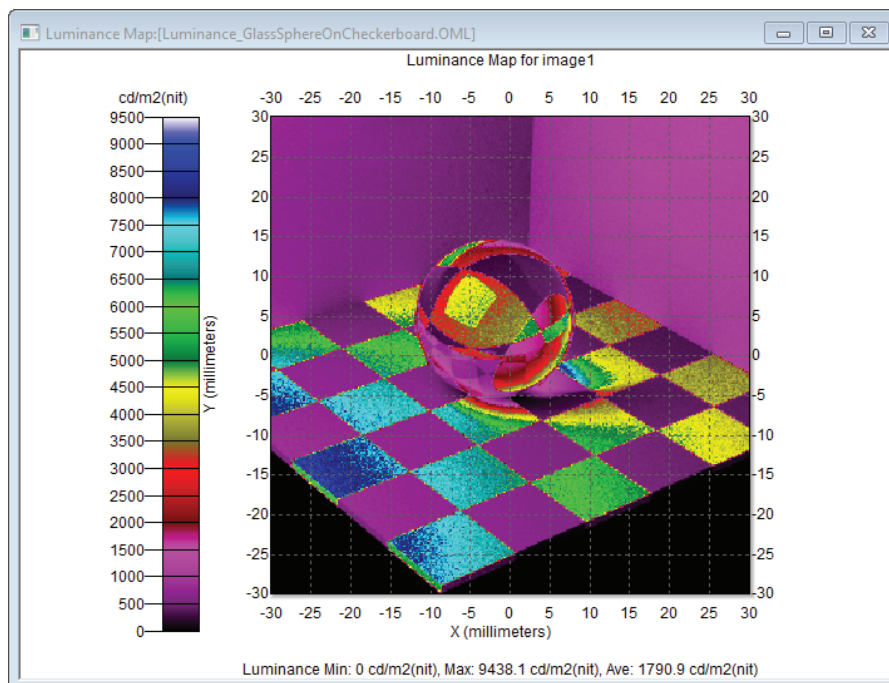Figure 5. Luminance map for Color Scheme = False color (rainbow)

Figure 6. Luminance map for Color Scheme = False color gradient (rainbow)
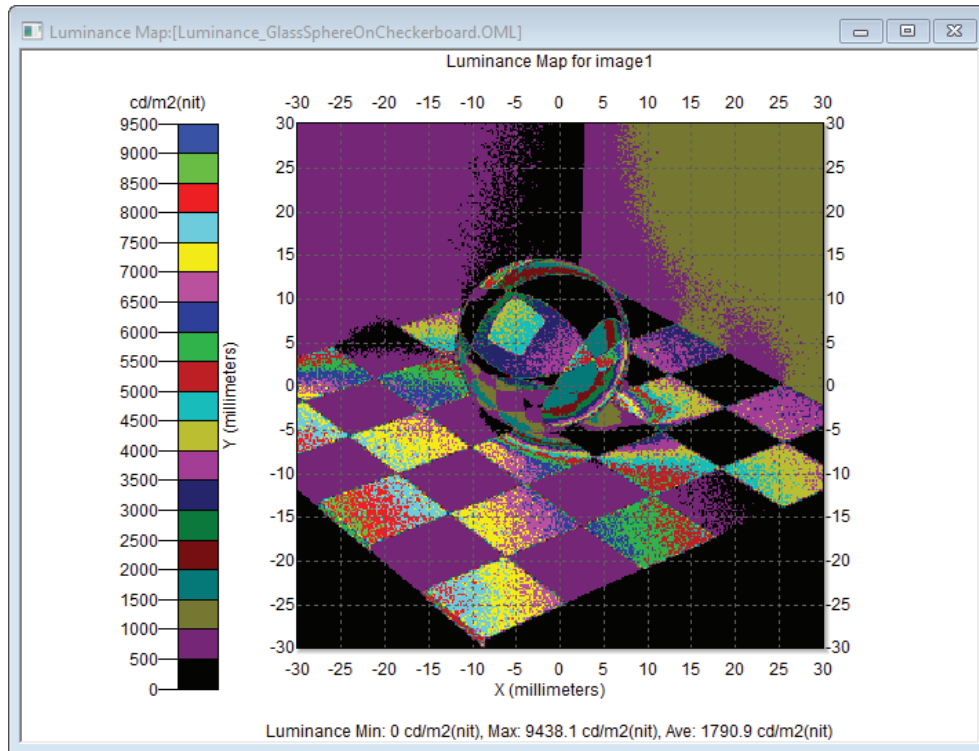
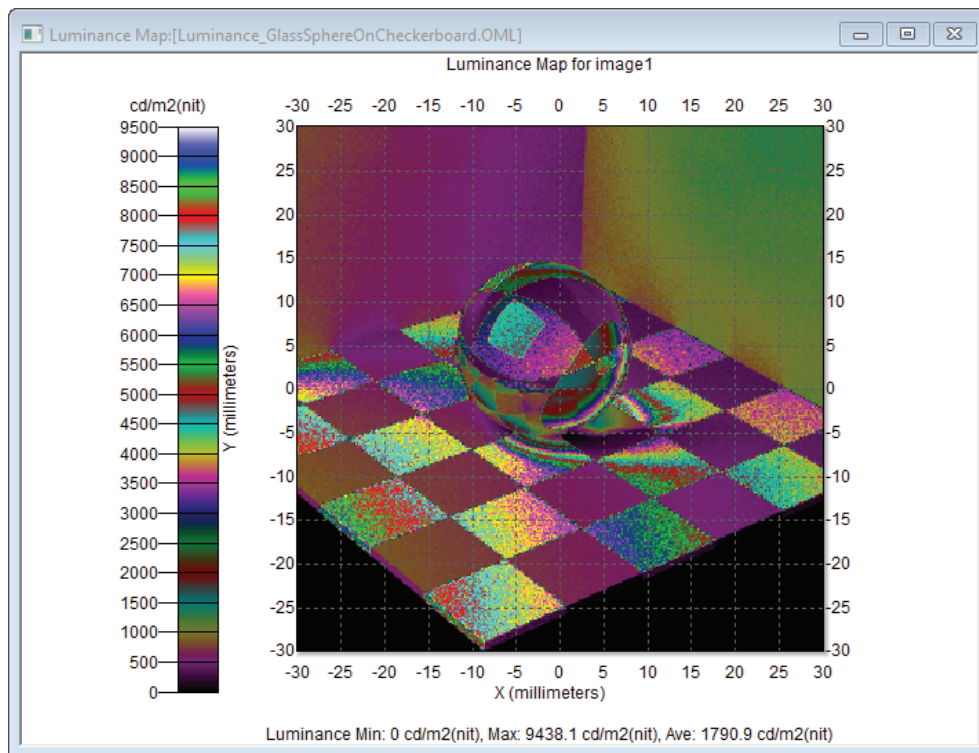Figure 7. Luminance map for Color Scheme = False color (step)

Figure 8. Luminance map for Color Scheme = False color gradient (step)
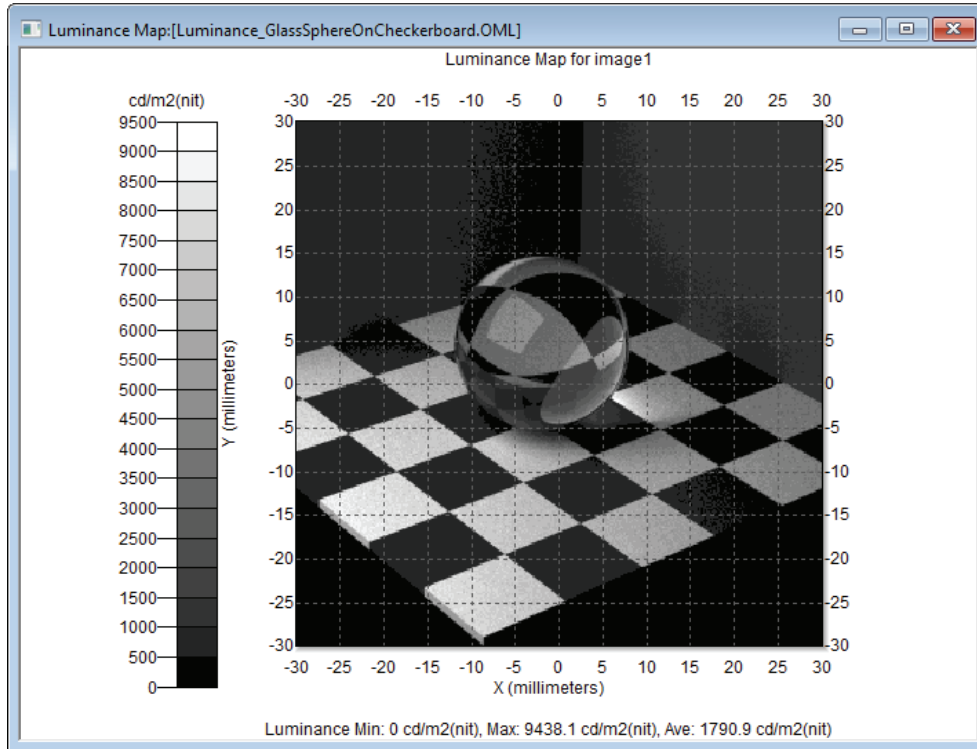
www.lambdares.com

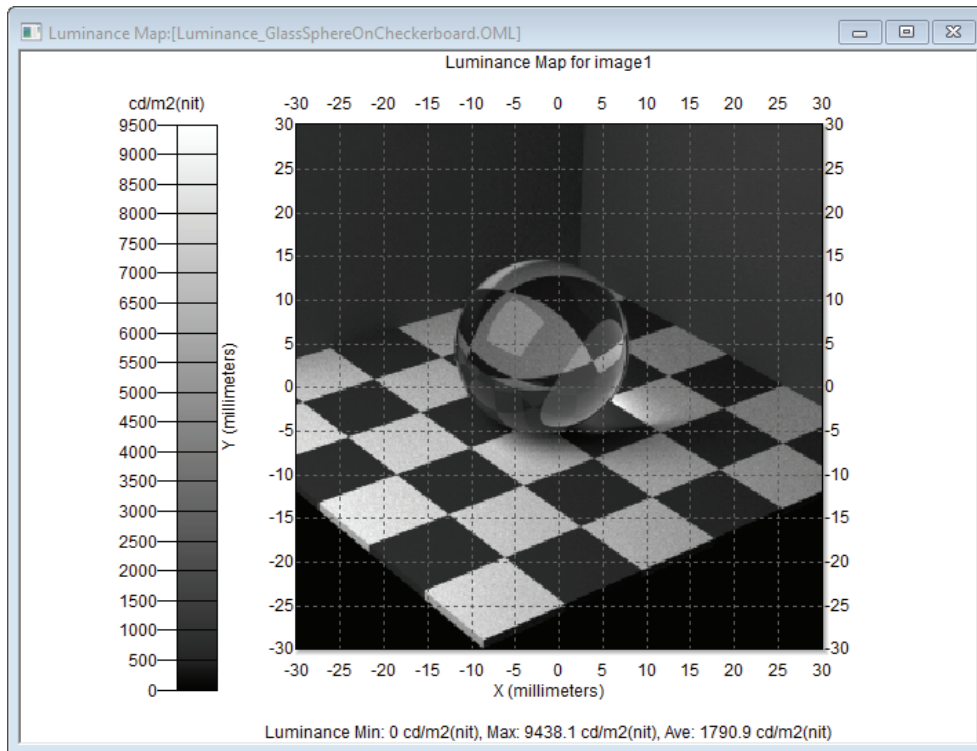Figure 9. Luminance map for Color Scheme = Grayscale

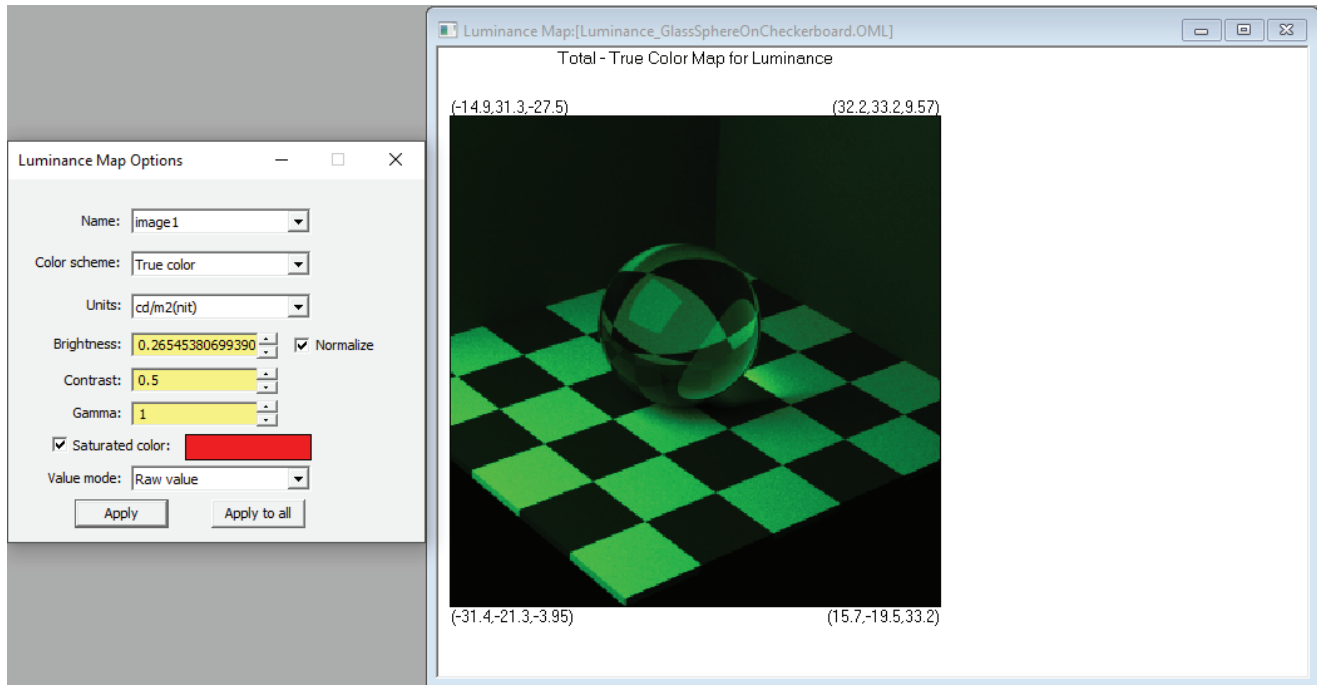Figure 10. Luminance map for Color Scheme = Grayscale gradient

Figure 11. Luminance map for Color Scheme = True color

This setting produces a rendered image of the geometry. One wavelength was traced for this example (0.5461 μm), which is in the green part of the visible spectrum. This accounts for the green cast in the rendering.

For an additional exercise, open the file "glass sphere on red-white checkerboard.OML".
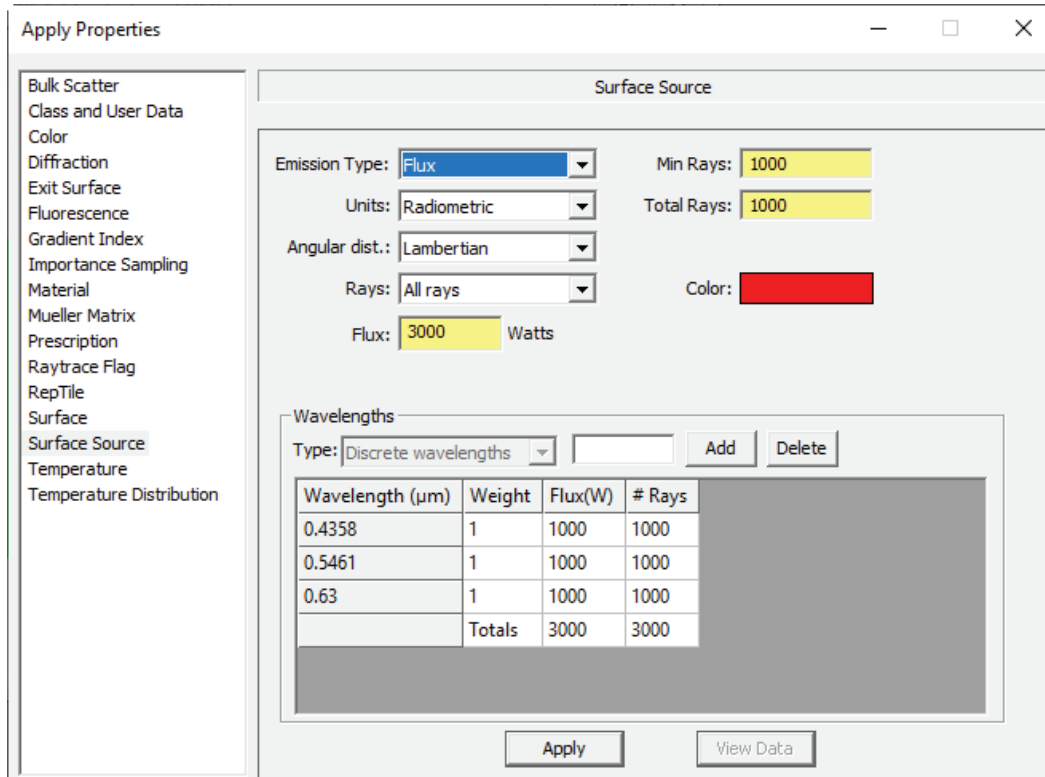

Figure 12. The Surface Source property showing three wavelengths defined.

In addition to the added wavelengths, the other change in the model "Luminance_GlassSphereOnRed-WhiteCheckerboard.oml" is that the objects named "black block" are now named "red block", and the surfaces of the "red block" have a Surface Property named "red paint, flat"applied.

To run the Luminance trace and view the Luminance Map for this model, follow the steps below:

- Select **Tools|Database>Import** to import the property file "Luminance_GlassSphereOnRed-WhiteCheckerboard_ Properties". When prompted to overwrite existing properties, choose "No to all". This will add the "red paint, flat" to your Properties Database (the other properties were added for the initial example).
- Select **Raytrace|Trace Luminance/Radiance**.
- After the rays have traced, select **Analysis|Luminance/Radiance Map** to view the map.
- Select **Analysis|Luminance/Radiance Map Options** to view the map with various options.
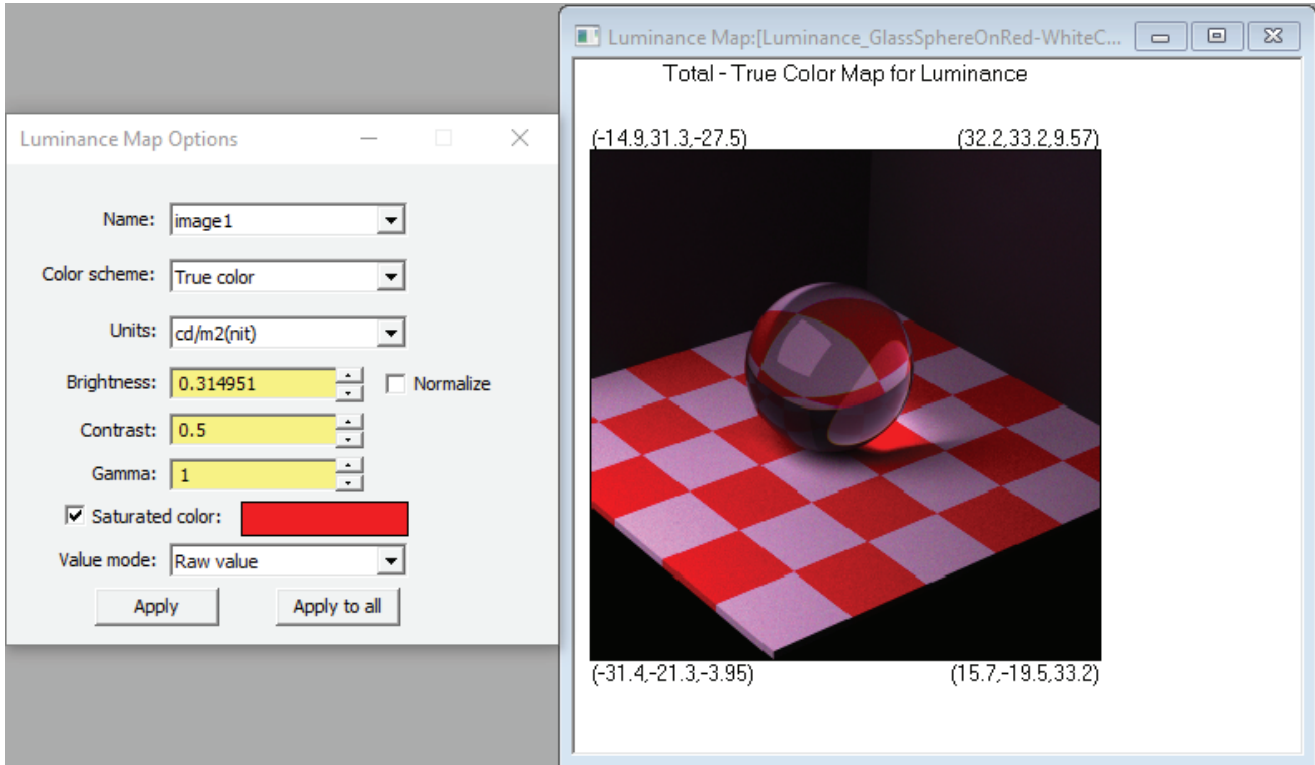
Figure 13. True color luminance map of glass sphere on red-and-black checkerboard.