reTORT Optical Design Software: Hybridization Metasurface Demonstration

This document describes the sample file **HybridizationMetasurface.gemsif** as a demonstration of hybridization with metasurfaces. Note that these features are still in alpha development, and are subject to changes and improvements in later versions of reTORT/GEMSIF.

The sample file includes a singlet lens with a curved front surface and a planar back surface. A radial polynomial metasurface is applied to the back surface. The metasurface includes some advanced properties shown in Figure 1 that pertain to hybridization. The **Use Real Discretized Phase** property enables the hybridization behavior, and the **Number of Phase Options** property determines how many phase options are used in the range of 0–2π. For instance, if **Number of Phase Options** is set to **4**, then the available phase options are 0, $\frac{\pi}{2}$, π, and $\frac{3\pi}{2}$. The **Max Cells in Super-Cell** property caps the number of unit cells that will be evaluated for any given super-cell. At the moment, metasurface hybridization is only supported for anti-reflective metasurfaces, so these properties will be disabled if the **Type** property is not set to **AntiReflective**.

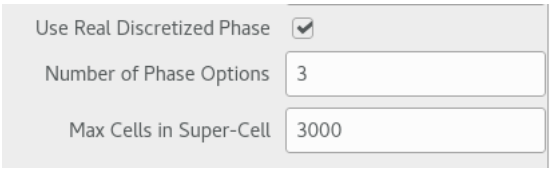

Figure 1: Advanced boundary properties for hybridization.

Metasurface hybridization only supports radially-symmetric metasurfaces on the meridonal plane. Thus, the sample file is set to only display the meridonal rays. To view the meridonal rays more easily, click on the **X/Z Axes** button at the top of the model view (Figure 2) before running the simulation.

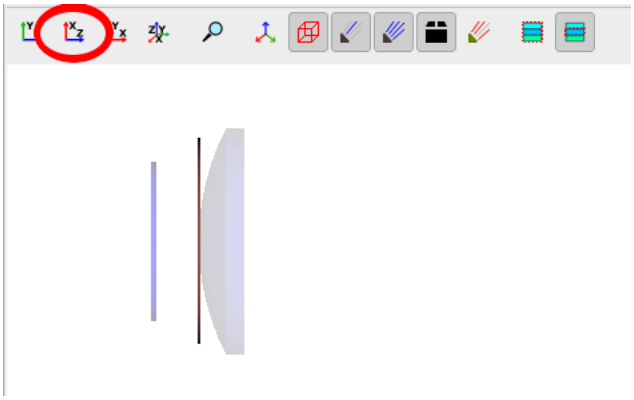

Figure 2: X/Z Axes view button in reTORT model view.

When the simulation is run, the sample file should generate a raytrace similar to Figure 3. Note the fainter rays around the focal point that represent rays with a lower magnitude.

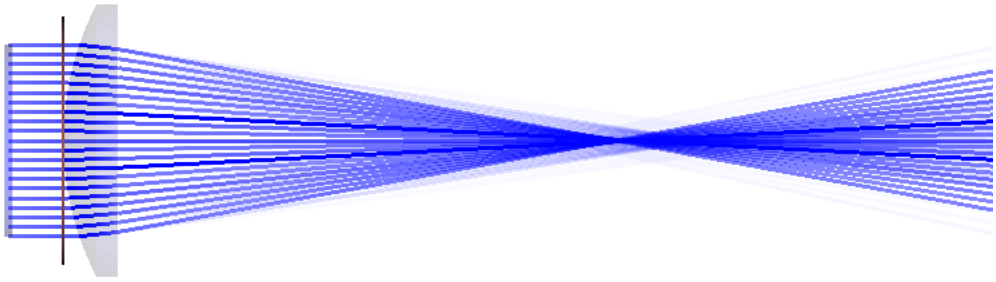

Figure 3: Sample raytrace for hybridized metasurfaces.

