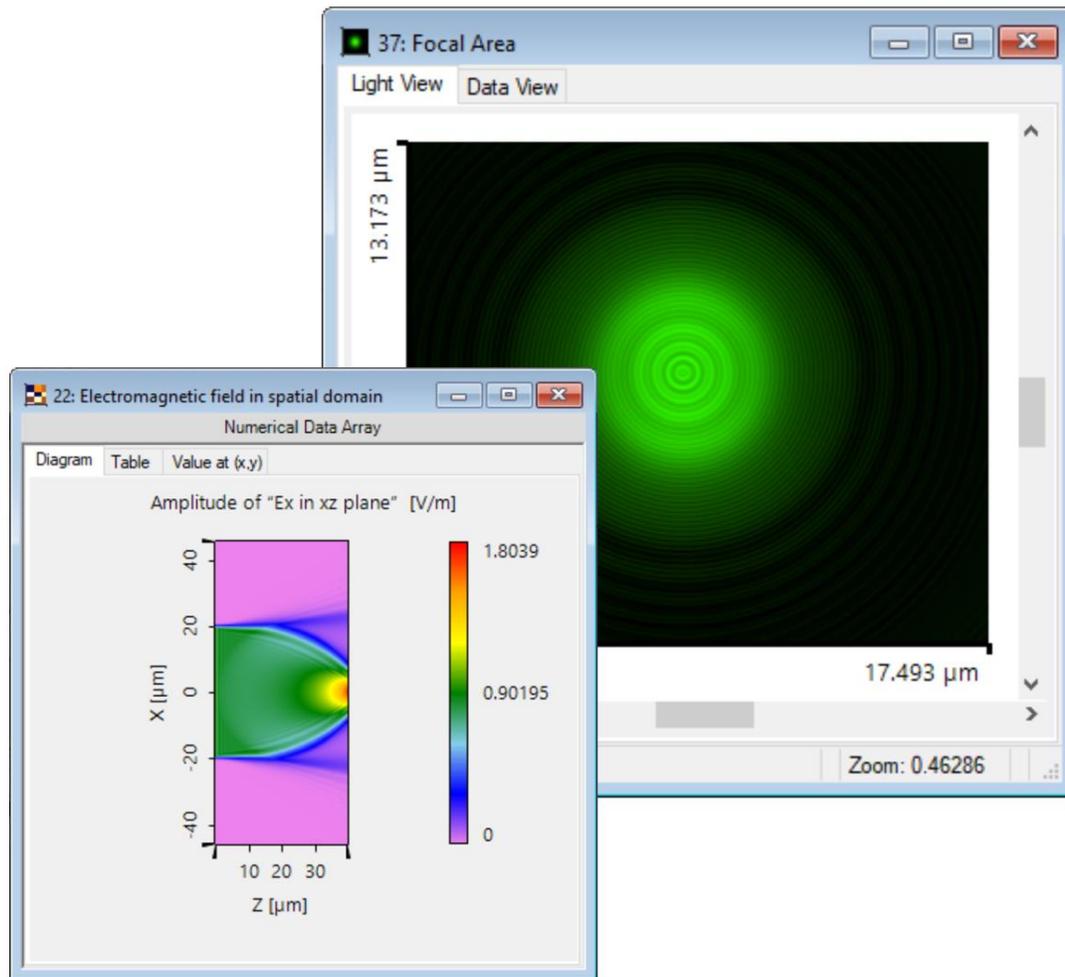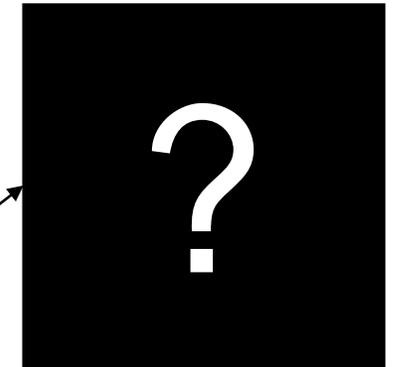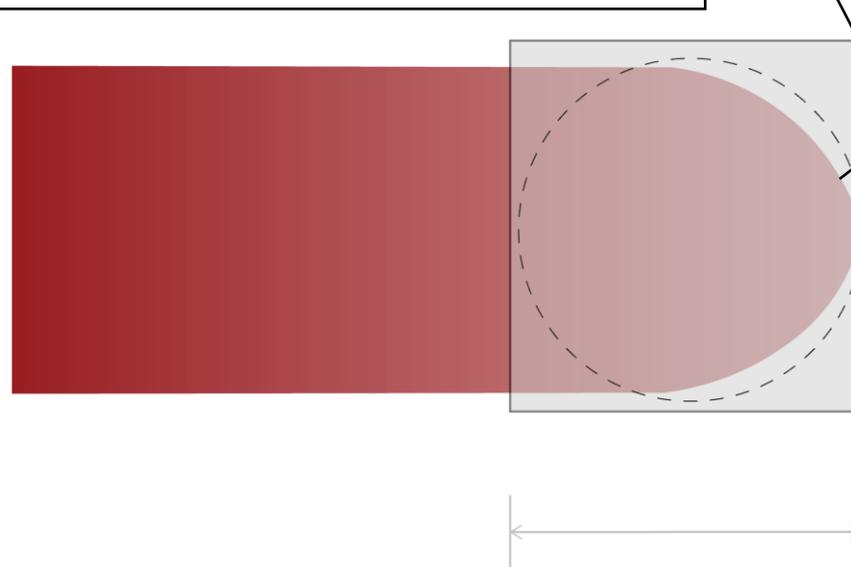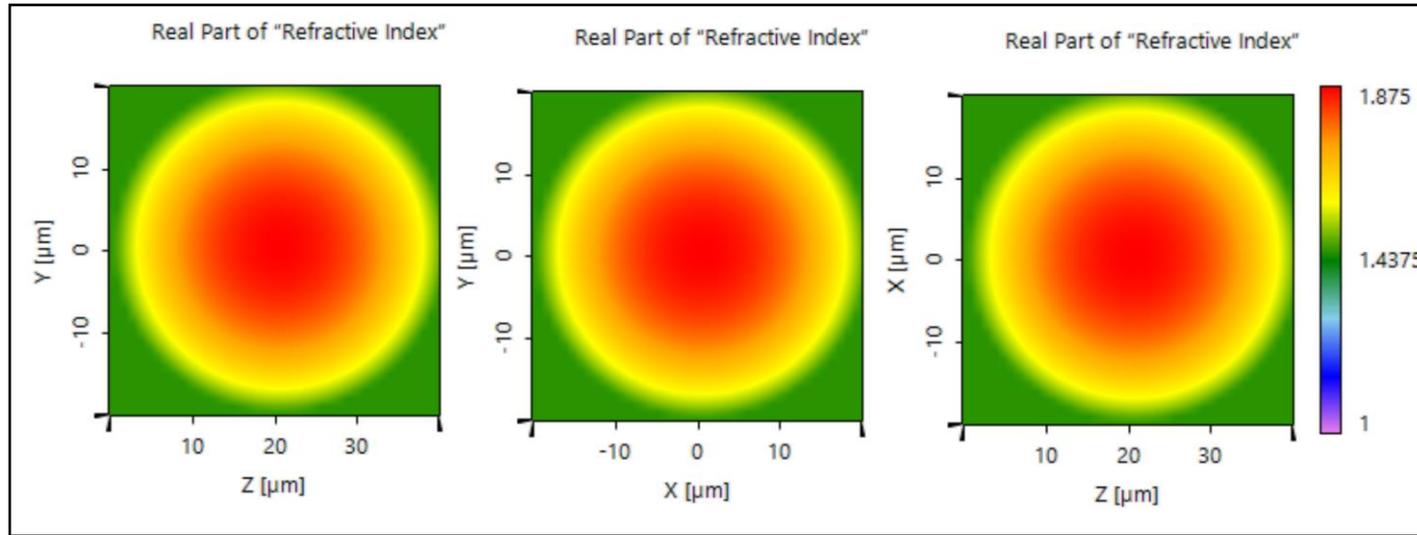# Focusing Through a Luneburg Lens

Abstract

The Luneburg lens is a famous example of a graded index media acting as a focusing lens. We are demonstrating the modeling of these kind of inhomogeneous media is possible in VirtualLab Fusion. While the Luneburg lens itself is radial symmetric by design, the component in VirtualLab Fusion is not restricted to that and asymmetric inhomogeneous components can be simulated as well.

Modeling Task

Intensity at focal area

Results with Field Tracing
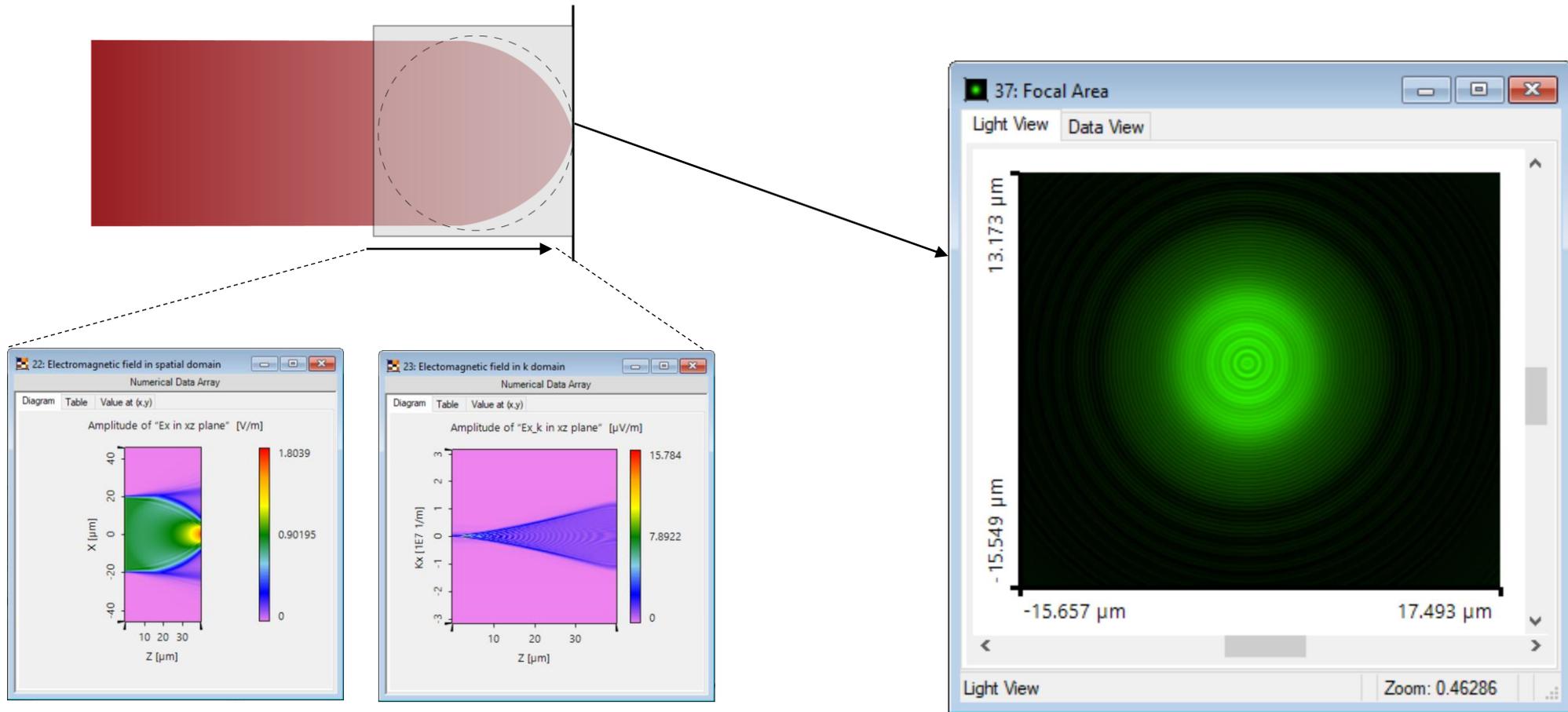
1D cut of the propagation through the media in
x and k - domain

Summary

- We show the propagation of a Plane Wave through a Luneburg Lens (ball lens with gradient index modulation).
- Two Optical Setups are attached to this document. One which calculates the focal spot of the lens by fully recognizing the 3D-Structure of the Luneburg Lens, and the other one calculates a 2D Cut through the media.
- While the Luneburg lens itself is radial symmetric it is also possible to propagate through any kind inhomogeneity by using a programmable medium.
- It is also possible to change the Plane Wave to an arbitrary electromagnetic field. In this case the sampling parameters inside the medium need to be adjusted.
- For the setups to function properly it is required to start VirtualLab Fusion in "Administrator-Mode" and to use Classic Field Tracing as a Simulation Engine