RSI.014

Demonstration of Abbe's Resolution Limit

The resolution limit of an imaging system with an ideal lens is investigated. To this end we use an ideal grating object and consider its image for different periods. Abbes resolution limit is illustrated. The effect of the wavelength on the resolution is demonstrated also.

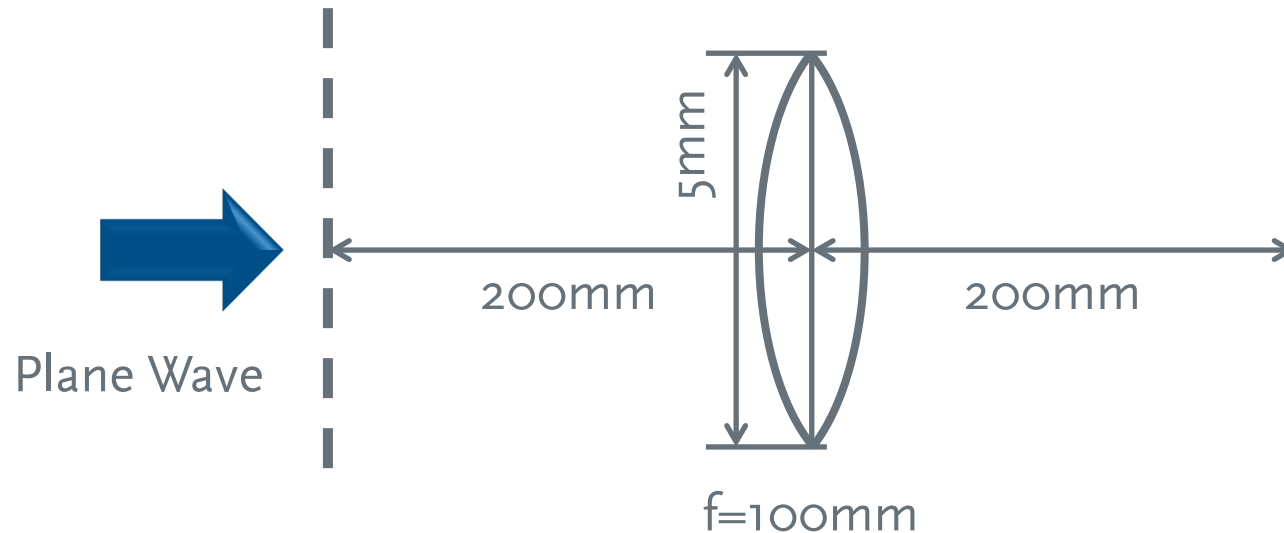Keywords: Imaging, Resolution, Diffraction Limited, Gratings

Required Toolboxes: Starter Toolbox

by René Krieg (LightTrans)
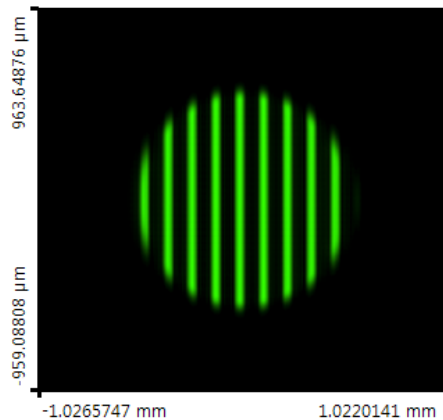
LIGHTTRANS

Modeling Task

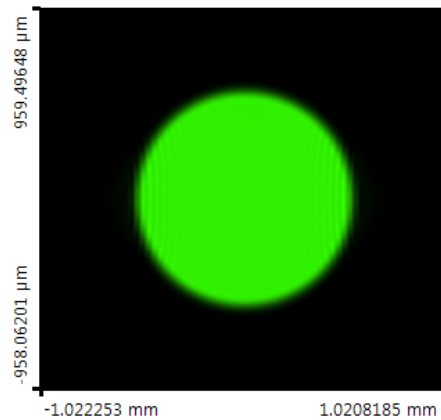The following imaging setup will be used to illustrate Abbe's resolution limit:

Results

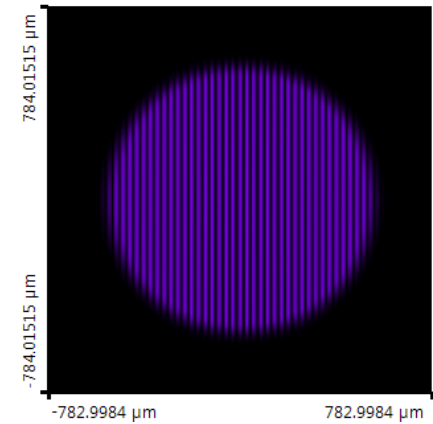As stated by Abbe's law, the resolution of the grating's image depends on slit width and wavelength:

λ=532nm,
Slit width = 40μm
Period = 120μm

λ=532nm,
Slit width = 9μm
Period = 28μm

λ=360nm,
Slit width = 9μm
Period = 28μm

Conclusion

Wave optical effects, like Abbe's law of limiting resolution, can be easily simulated with LightTrans VirtualLab™.