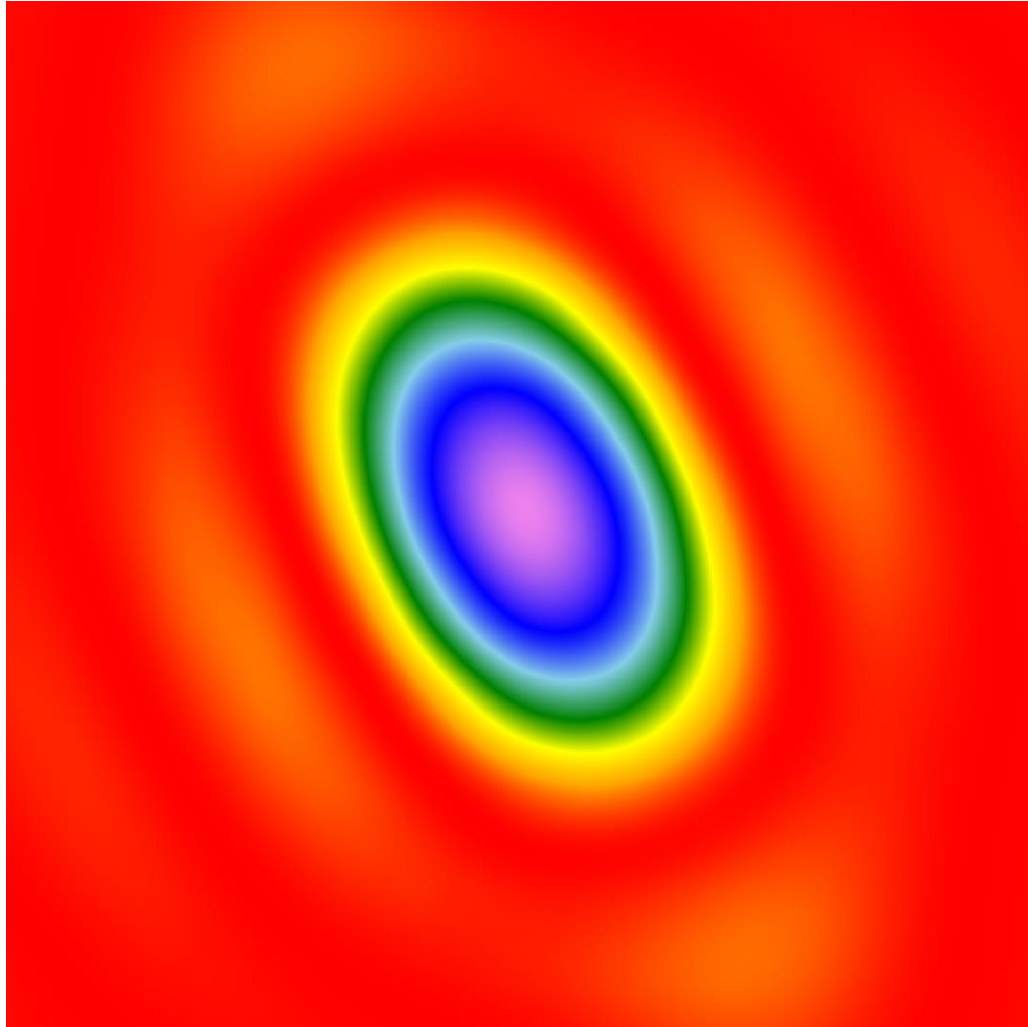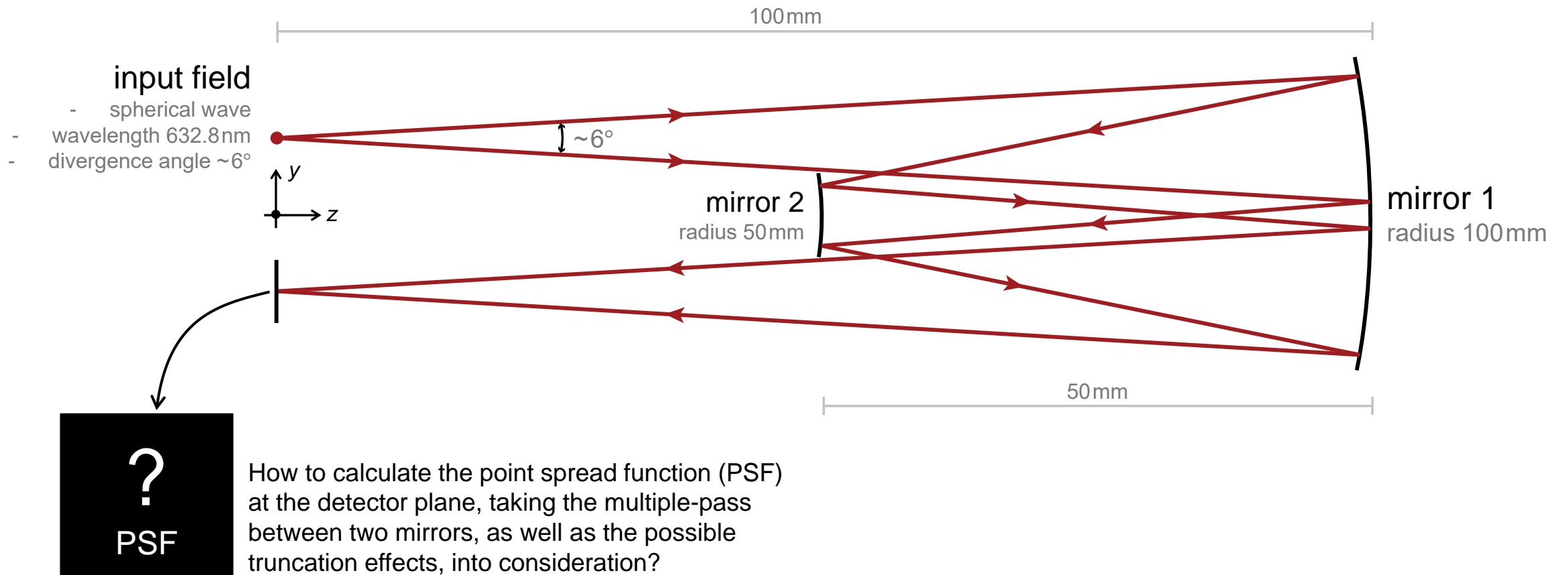# Analysis of an Offner System with Non-Sequential Field Tracing
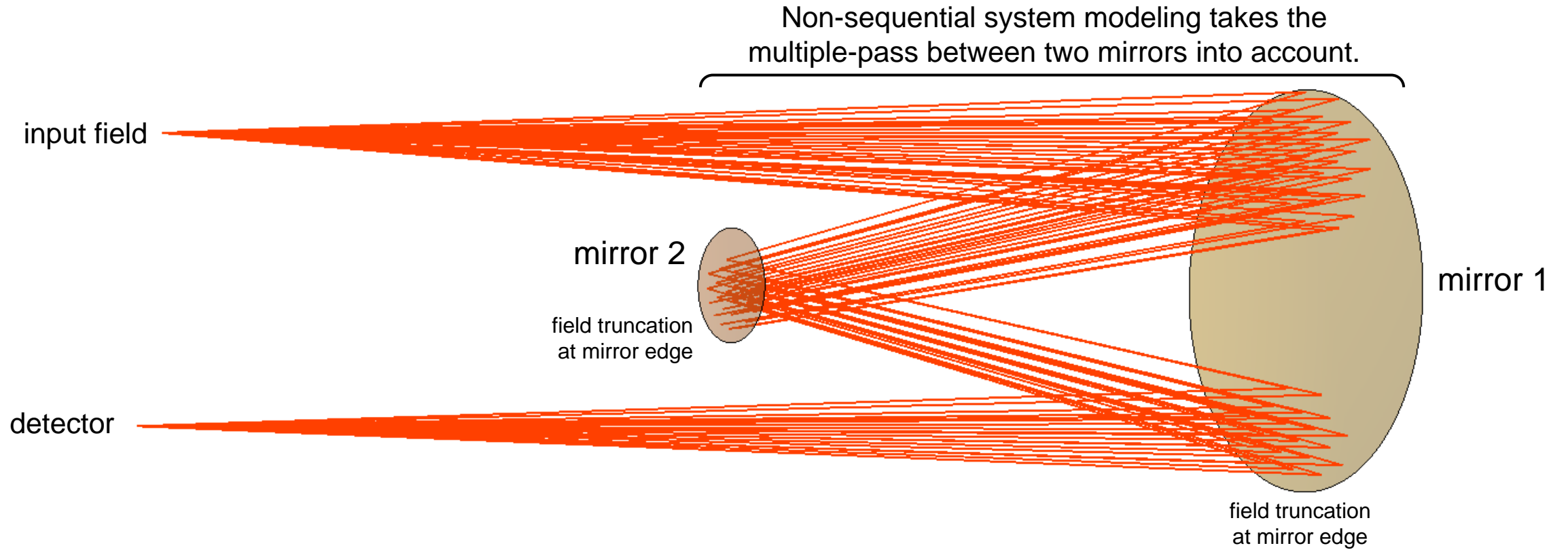
Abstract

An Offner system usually consists of two spherical mirrors concentric around the same center, with a magnification $m=1$. The light is supposed to be reflected back and forth between the two mirrors. Such an optical system can be conveniently set up with the non-sequential extension in VirtualLab. In this example, an Offner system is modeled and its imaging property is investigated. By varying the lateral position of the source, it is shown that mirror edges may truncate the field in certain situations, and therefore affect the imaging quality at the detector plane.

Modeling Task

input field
- spherical wave
- wavelength 632.8 nm
- divergence angle ~6°

~6°

100 mm

mirror 1
radius 100 mm

mirror 2
radius 50 mm

50 mm

?
PSF

How to calculate the point spread function (PSF) at the detector plane, taking the multiple-pass between two mirrors, as well as the possible truncation effects, into consideration?

Results

Non-sequential system modeling takes the multiple-pass between two mirrors into account.

input field

mirror 2

field truncation
at mirror edge

mirror 1

detector

field truncation
at mirror edge

Results

input field
lateral shift
in *y* and *x* direction

Calculation of PSF on detector plane, with truncation effects included, takes only 2 seconds!

71: Camera Detector #600 after M1 #1 (R) (Field...
Chromatic Fields Set
PSF at detector plane
(source shift *x*=0, *y*=7mm)

no field truncation

73: Camera Detector #600 after M1 #1 (R) (Field...
Chromatic Fields Set
PSF at detector plane
(source shift *x*=0, *y*=10mm)
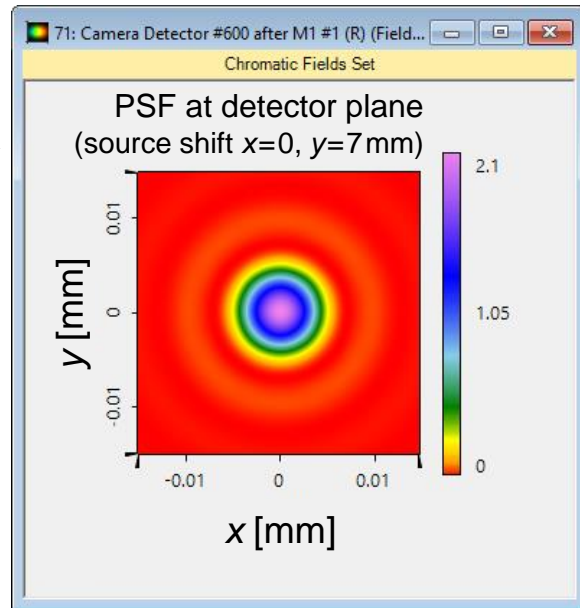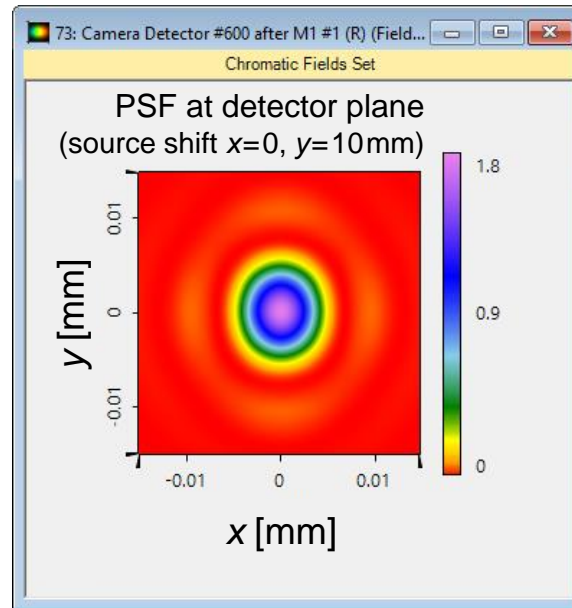
truncation in *y* direction

74: Camera Detector #600 after M1 #1 (R) (Field...
Chromatic Fields Set
PSF at detector plane
(source shift *x*=5, *y*=10mm)
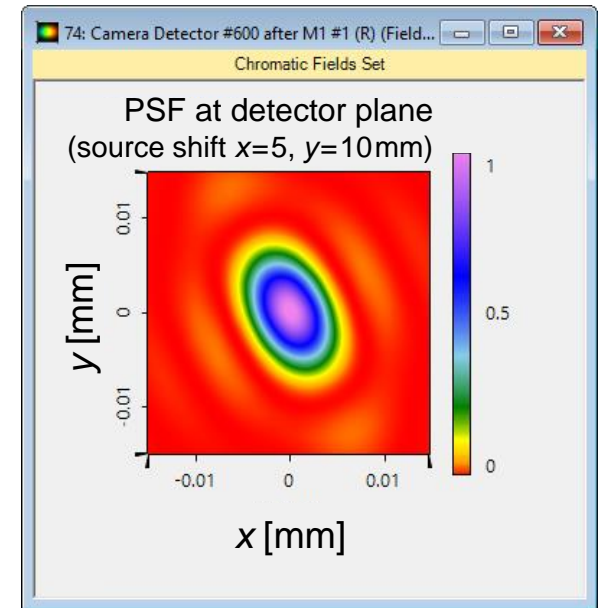
truncation in both directions

Document Information

title	Analysis of an Offner System with Non-Sequential Field Tracing
version	1.0
VL version used for simulations	7.3.0.50 (Non-sequential Extension)
category	Application Use Case