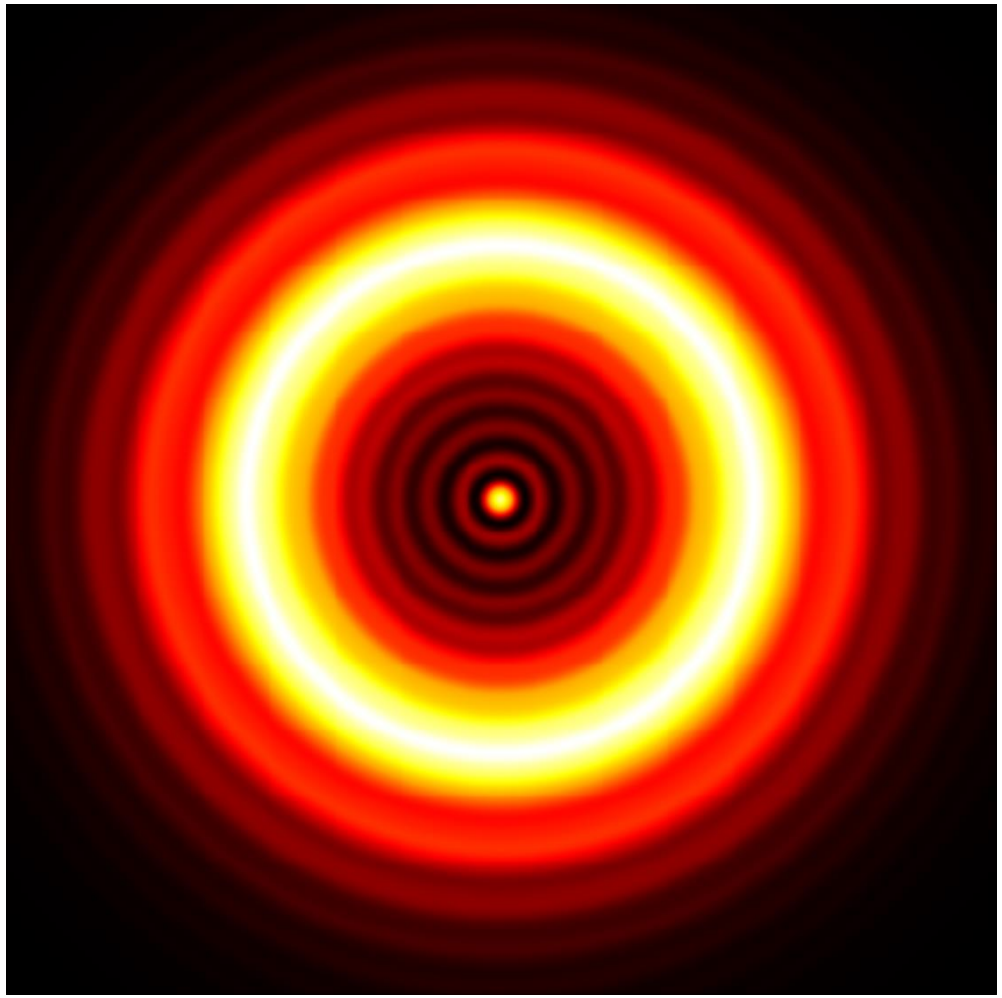
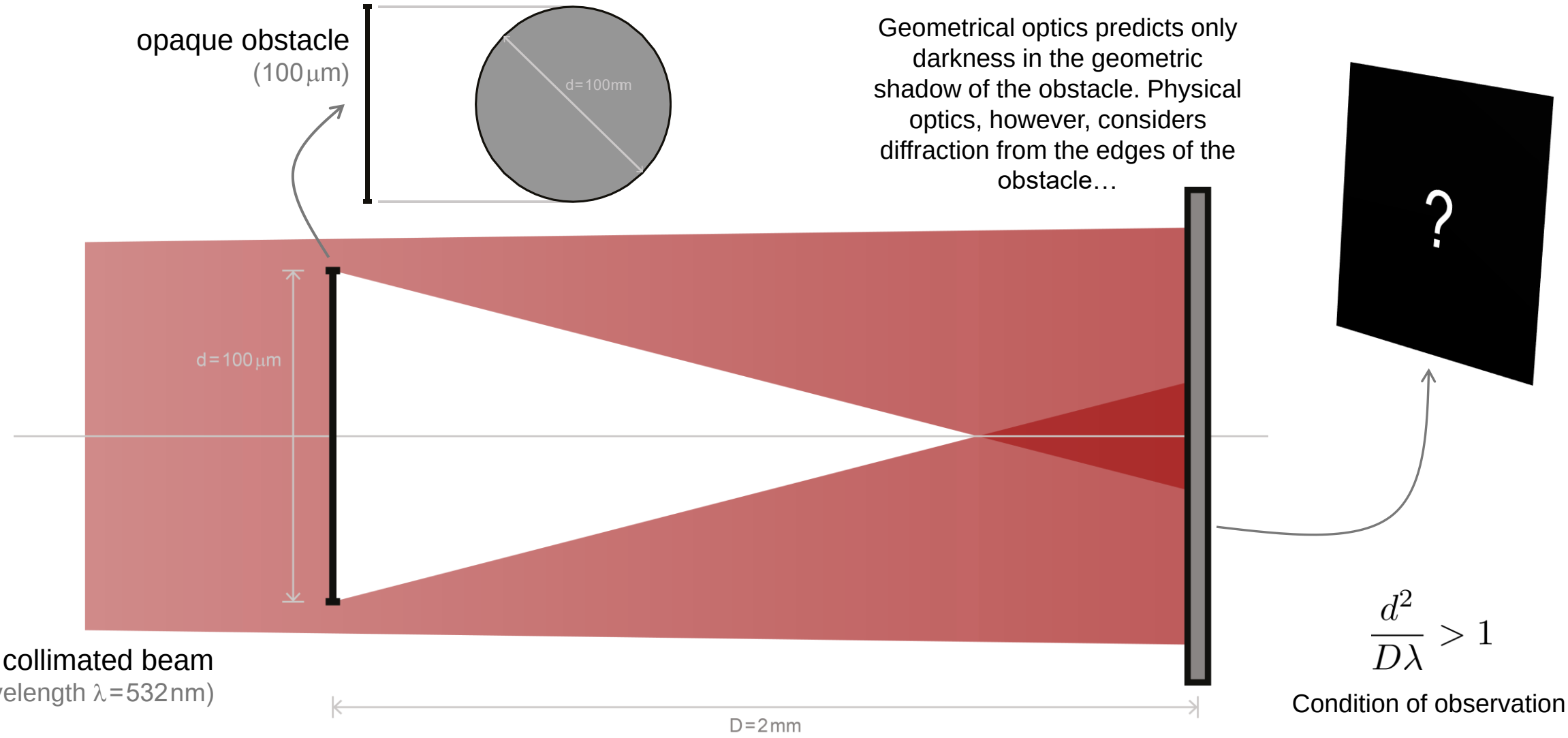
Observation of the Poisson Spot

Abstract



The first-time observation of Poisson's (or Arago's) spot in 1818 constituted one of the most relevant experiments in the history of optics, helping discard the (at the time) favoured position of attributing a corpuscular nature to light. When Fresnel presented his theory of diffraction before the French Academy of Sciences, Poisson, a member of the committee, scoffed at the fact that Fresnel's approach predicted a bright spot in the shadow of a circular obstacle placed in the way of a beam of light. And sure enough, as fellow committee member Arago demonstrated, this spot could be observed experimentally.

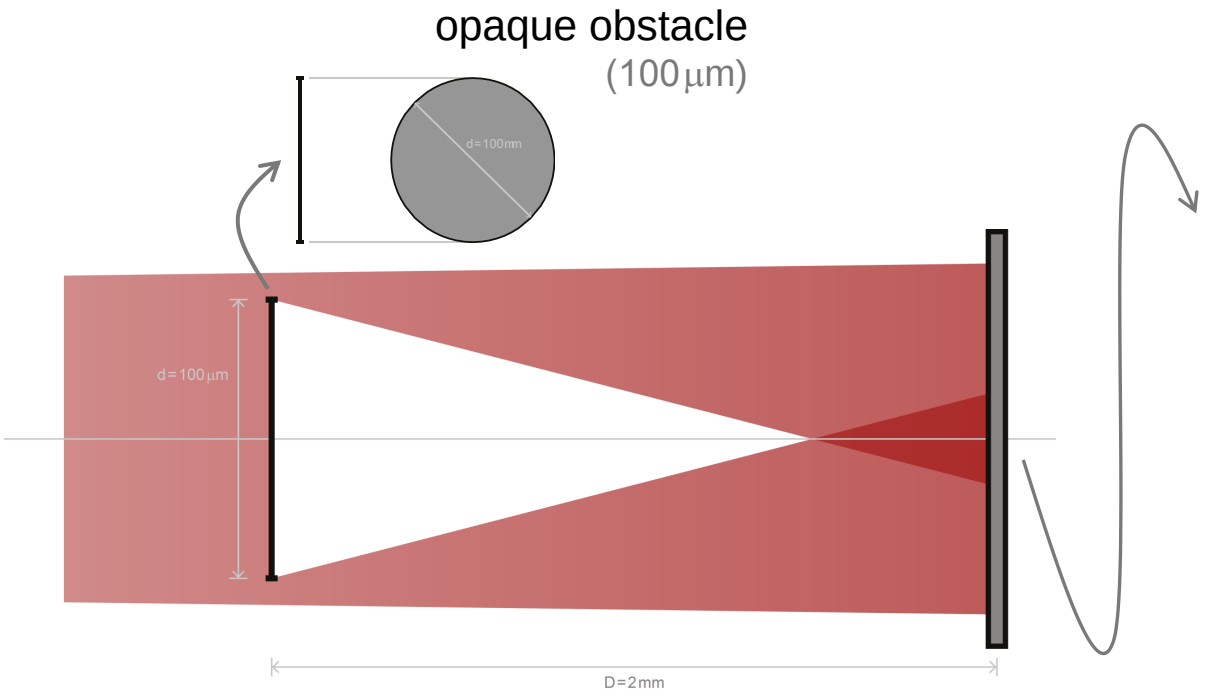
Modeling Task



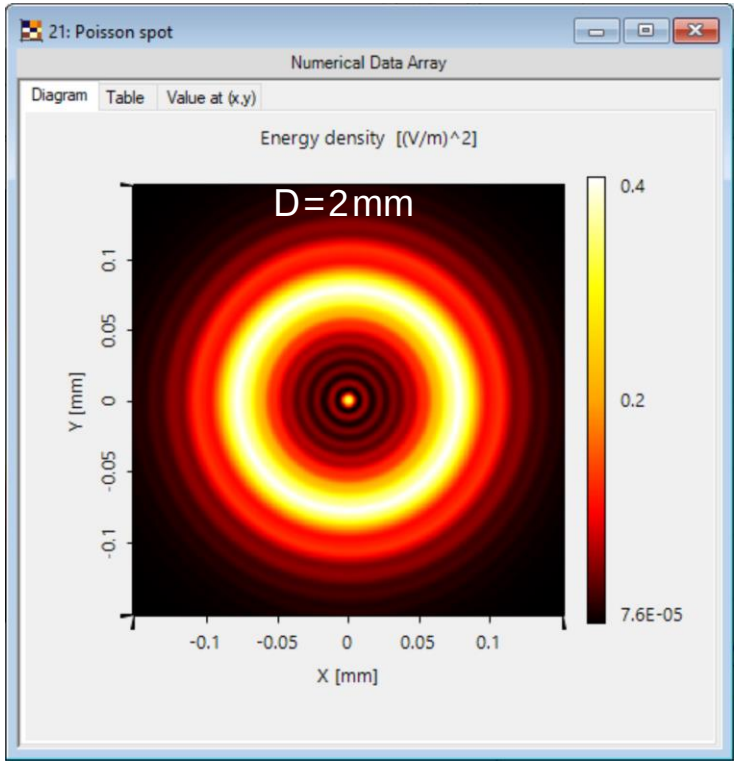
$$\frac{d^2}{D\lambda} > 1$$

Condition of observation

Observation of the Poisson spot

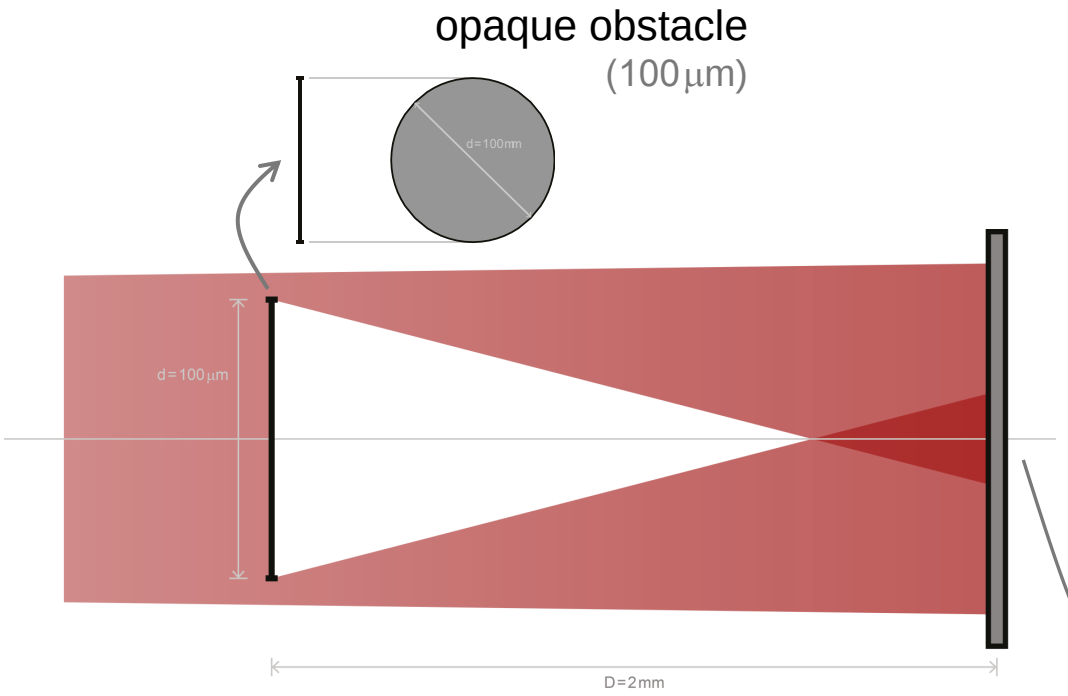


collimated beam
(wavelength λ=532nm)



It is only diffraction from the edges what permits light to travel to the geometric shadow of the obstacle!

Observation of the Poisson spot



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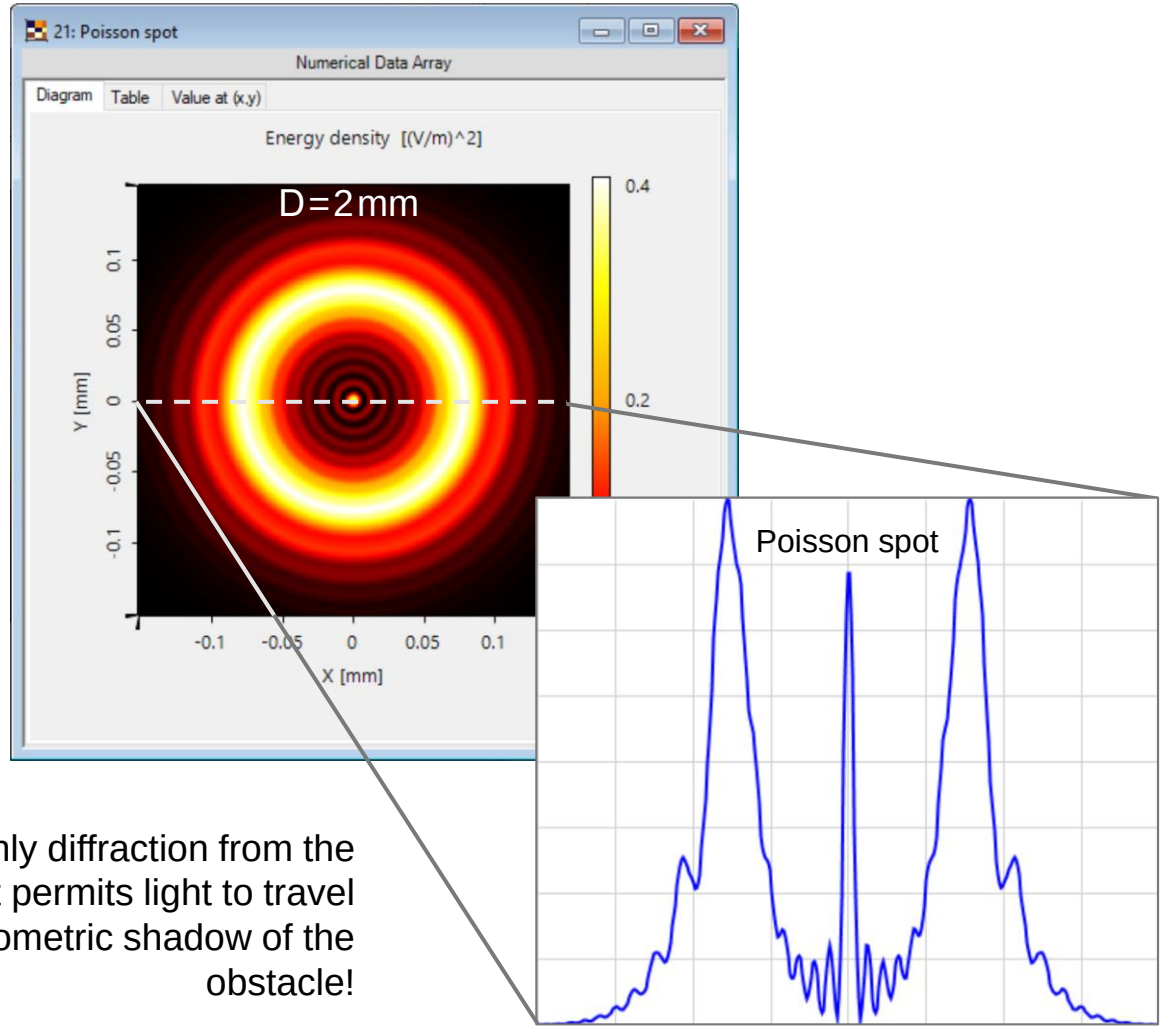

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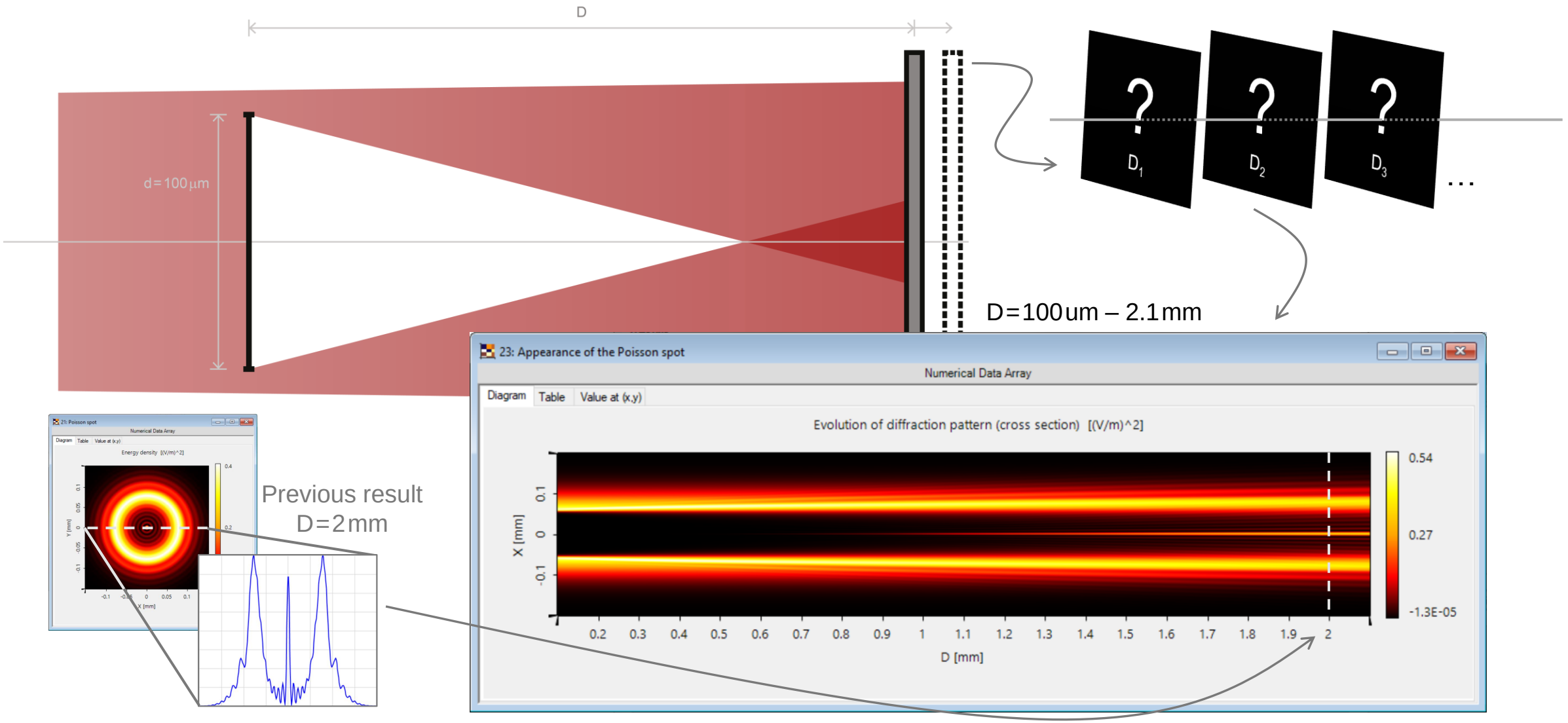
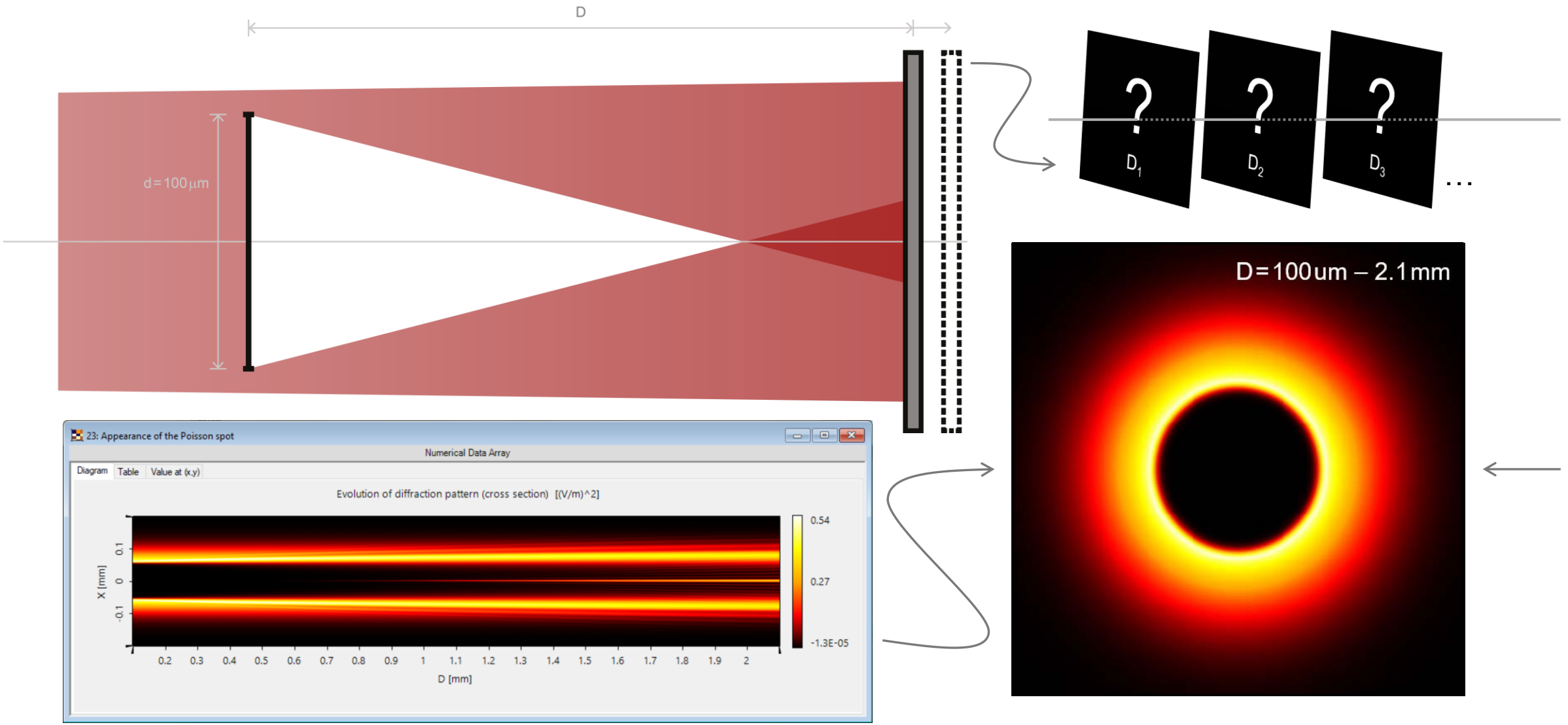
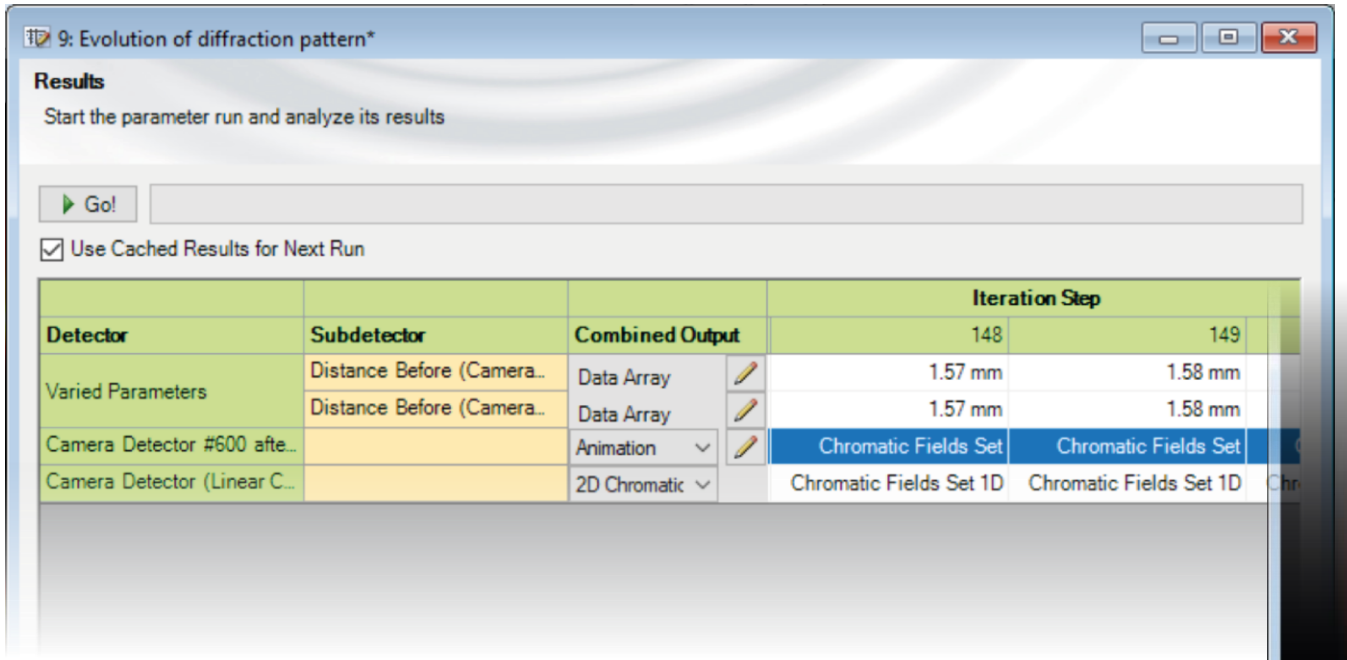
Evolution of Diffraction Pattern and Appearance of the Spot



Evolution of Diffraction Pattern and Appearance of the Spot

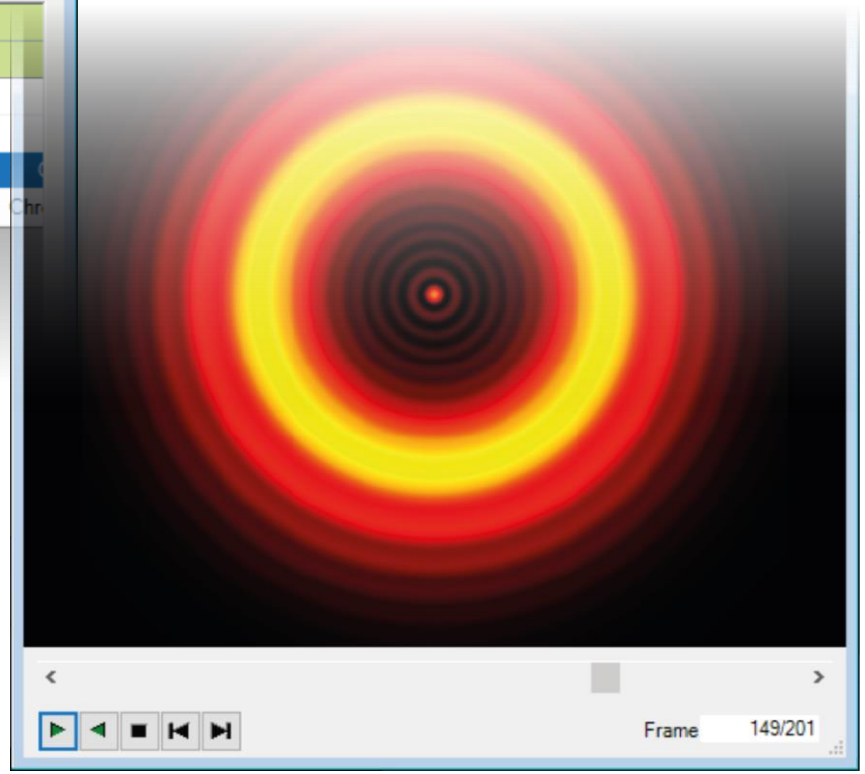


Peek into VirtualLab Fusion



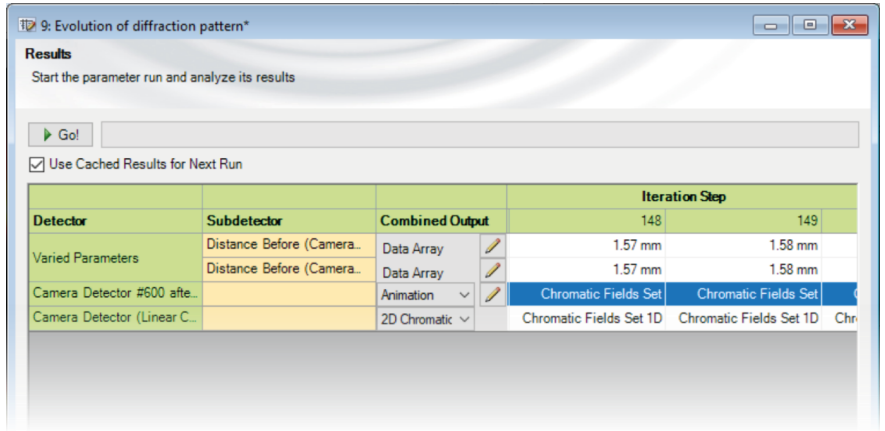
Parameter Run to investigate evolution of diffraction pattern with screen position

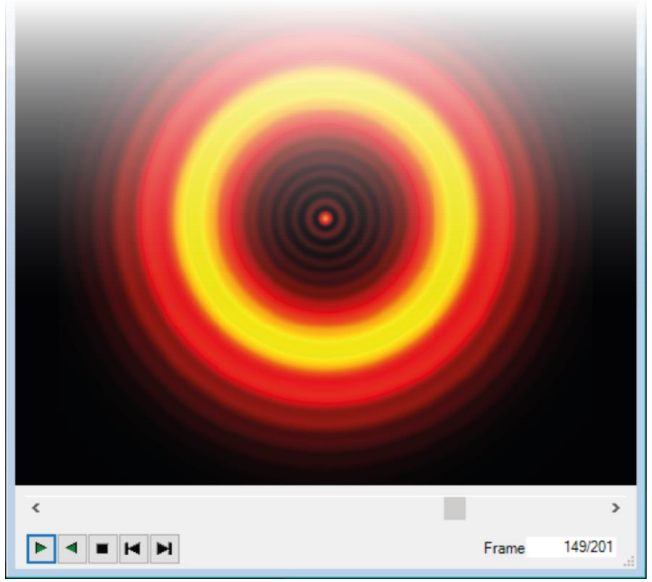
Generate animation to better investigate the effect of a third independent variable



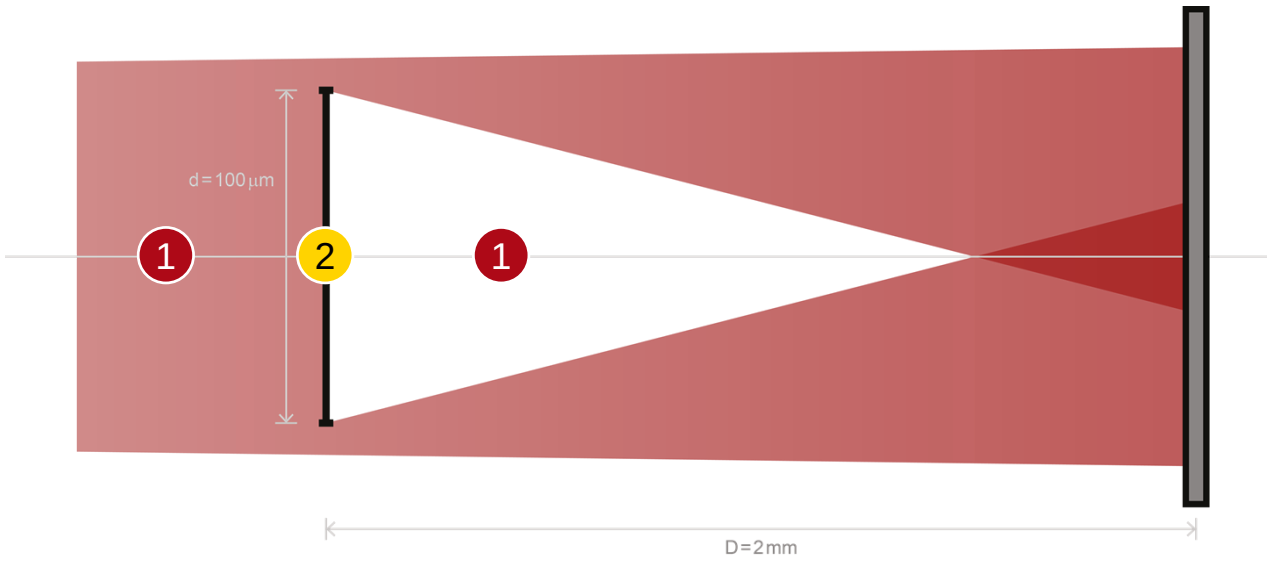
Workflow in VirtualLab Fusion

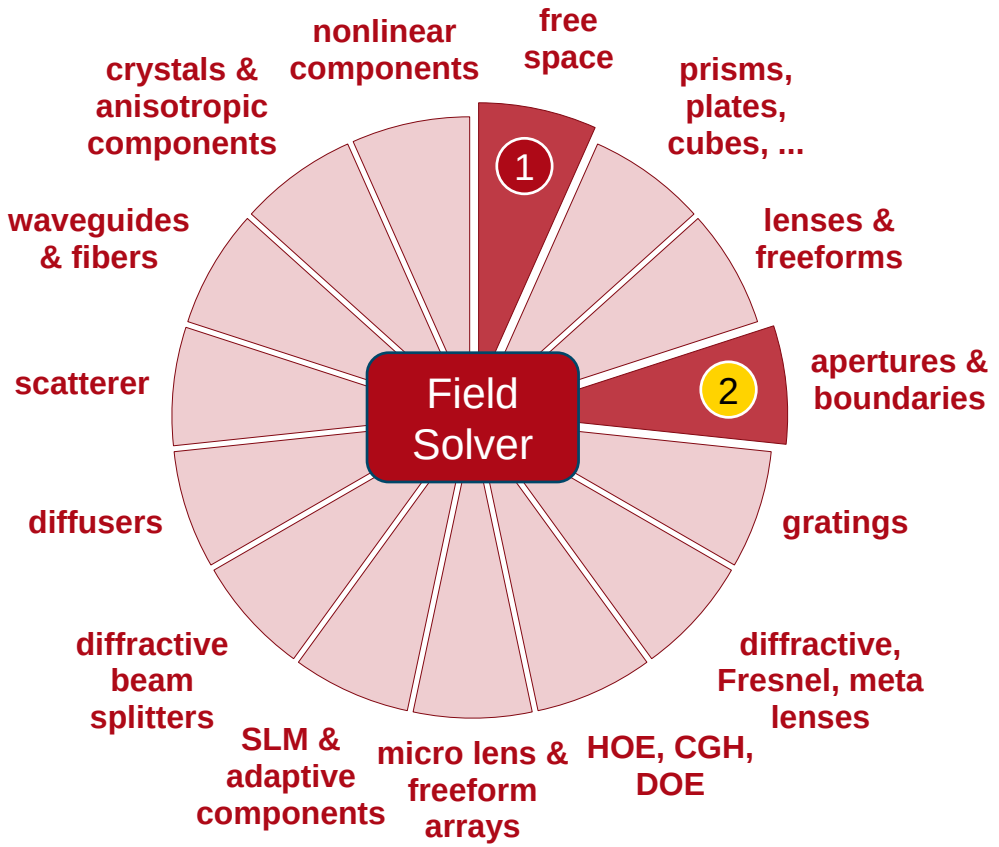
- Configure the Camera Detector
  - Usage of Camera Detector [Use Case]
- Set up the Parameter Run
  - Usage of the Parameter Run document [Use Case]
- Create the animation
  - Animation generation with Par. Run [Use Case]





VirtualLab Fusion Technologies





idealized component

Document Information

title	Observation of the Poisson Spot
document code	MISC.0072
version	1.0
toolbox(es)	Starter Toolbox
VL version used for simulations	7.5.0.158
category	Application Use Case
further reading	- Advanced PSF & MTF Calculation for System with Rectangular Aperture