Observation of the Poisson Spot
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

Geometrical optics predicts only darkness in the geometric shadow of the obstacle. Physical optics, however, considers diffraction from the edges of the obstacle…

Condition of observation

\[ \frac{d^2}{D \lambda} > 1 \]
Observation of the Poisson spot

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

Opaque obstacle (100 μm)

Collimated beam (wavelength $\lambda = 532 \text{ nm}$)

It is only diffraction from the edges what permits light to travel to the geometric shadow of the obstacle!
Evolution of Diffraction Pattern and Appearance of the Spot

Previous result $D=2\text{mm}$

$D=100\ \text{um} - 2.1\ \text{mm}$
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

- Prisms, plates, cubes, ...
- Lenses & freeforms
- Apertures & boundaries
- Gratings
- Diffractive, Fresnel, meta lenses
- HOE, CGH, DOE
- Micro lens & freeform arrays
- SLM & adaptive components
- Diffractive beam splitters
- Waveguides & fibers
- Scattering
- Diffusers
- Crystals & anisotropic components
- Nonlinear components
- Free space
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