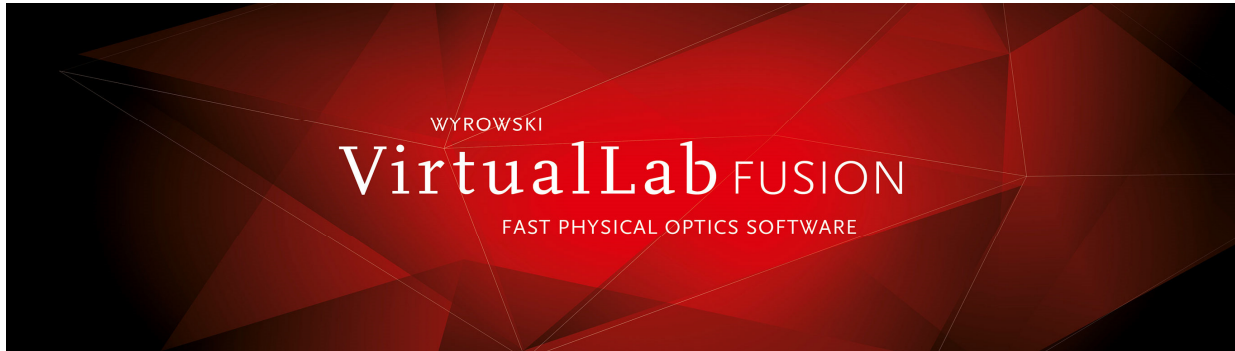# VirtualLab Fusion

Fast Physical Optics Software

Diffraction, Interference, Polarization, Wavefront Aberrations, Partial Coherence

**Simulation, Design, Optimization**

- **Rigorous physical optics analysis: multiple Maxwell solvers** for accurate analysis in different zones of the optical system
- **Fast: numerically efficient computation**
  VirtualLab speeds solution of Maxwell's equations by switching between the spatial domain in geometric regions of the optical system and the k-domain in diffractive regions.
  See diagrams below
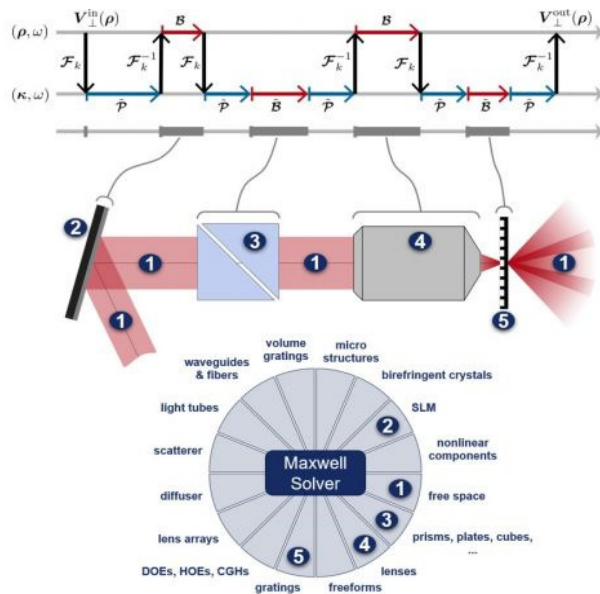
- **Multiple free space propagation operators, including:**
  Spectrum of plane waves, Fresnel, Far field, and Geometric
  Two modes:
  Automatic propagation operator selection algorithm for minimizing error and minmizing numerical effort, or
  Manual selection of propagation operator

Different modeling techniques
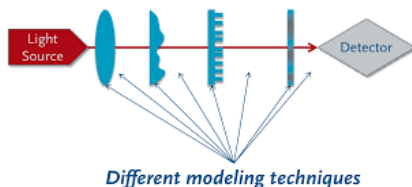
APPLICATIONS

Complex optical systems
Refractive and diffractive optics
Optical feature sizes < 5X the wavelength,
  including subwavelength
High NA focusing
Fiber coupling
Grin lenses
Microlens arrays
Spatial light modulators
Interferometers, spectrometers
Microscopes, telescopes
DOEs, CGHs, diffusers, beam shapers,
  pattern generation
Diffractive lenses, metalenses
Gratings: 2D/3D, subwavelength, volume
Light guides: VR/AR/MR, HUD
Spacio-temporal fs pulse analysis

MORE FEATURES

Fully vectorial solution of Maxwell's equations
Sequential and non-sequential physical optics
DOE simulation, design, and optimization
Export DOE fabrication files
Fourier Modal Method (same as RCWA)
  for rigorous modeling of periodic structures
Parameter run for analysis and optimization
Library of C# snippets for custom programming
Import MATLAB custom code
Import Zemax data for fully vectorial physical
  optics modeling
Create Python batch files

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