

**KJ Innovation** — Innovative Optical Systems Design

# Diffraction Optics Simulation and Design from KJ Innovation

Ken Johnson (dba KJ Innovation) provides advanced simulation software and design services, primarily in the area of diffraction grating technology and systems employing diffraction optics. KJ Innovation's capabilities and recent activities include the following:

## Diffraction grating simulation

The [Grating Diffraction Calculator \(GD-Calc®\)](#), authored by Ken Johnson, is a MATLAB-based software package for diffraction grating simulation. GD-Calc computes diffraction efficiencies and polarization characteristics (multi-order transmission and reflection) of line gratings, biperiodic gratings, and multilayer-stack gratings with any number of layers and materials (dielectric or metallic). All software, documentation, demo tutorials, and sample output can be viewed and downloaded from the above-linked Code Ocean code capsule.

A recently-developed successor to GD-Calc, based on [more advanced algorithms](#), has new capabilities for modeling curved/tapered structures (cylinders, pyramids, etc.) without relying on the "staircase" approximation, and modeling of bi-anisotropic and inhomogeneous grating materials (e.g., magnetic, crystalline, holographic, gradient-index, etc.). The new code (provisionally titled the "Grating Simulation Toolbox", GSim), is not yet fully productized but can be used for specific customer applications.

For more information on the capabilities and use of either GD-Calc or GSim, please send your query in the contact form below.

## Optical systems design

KJ Innovation's current research focus is on parallel spot-scanning systems for extreme ultraviolet (EUV) maskless lithography and general microscopy:

- ["Maskless EUV Lithography"](https://www.euvlitho.com/2019/P22.pdf) <https://www.euvlitho.com/2019/P22.pdf>
- ["Maskless EUV lithography, an alternative to e-beam"](https://doi.org/10.1117/1.JMM.18.4.043501) <https://doi.org/10.1117/1.JMM.18.4.043501>

Part of this activity has included the development of advanced optical ray tracing and design methods based on automatic differentiation and efficient optimization.

## Other research activities

KJ Innovation's ongoing research activities are documented in [Ken Johnson's vixra postings](#). A variety of algorithm utilities are [posted on MATLAB Central](#). Ken Johnson is an inventor or co-inventor on [several dozen optics-related patents](#).

## Contact

Thank you for your interest. Please send me any questions below and I will respond as quickly as possible.



Ken Johnson

**Name \***

**Email \***

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