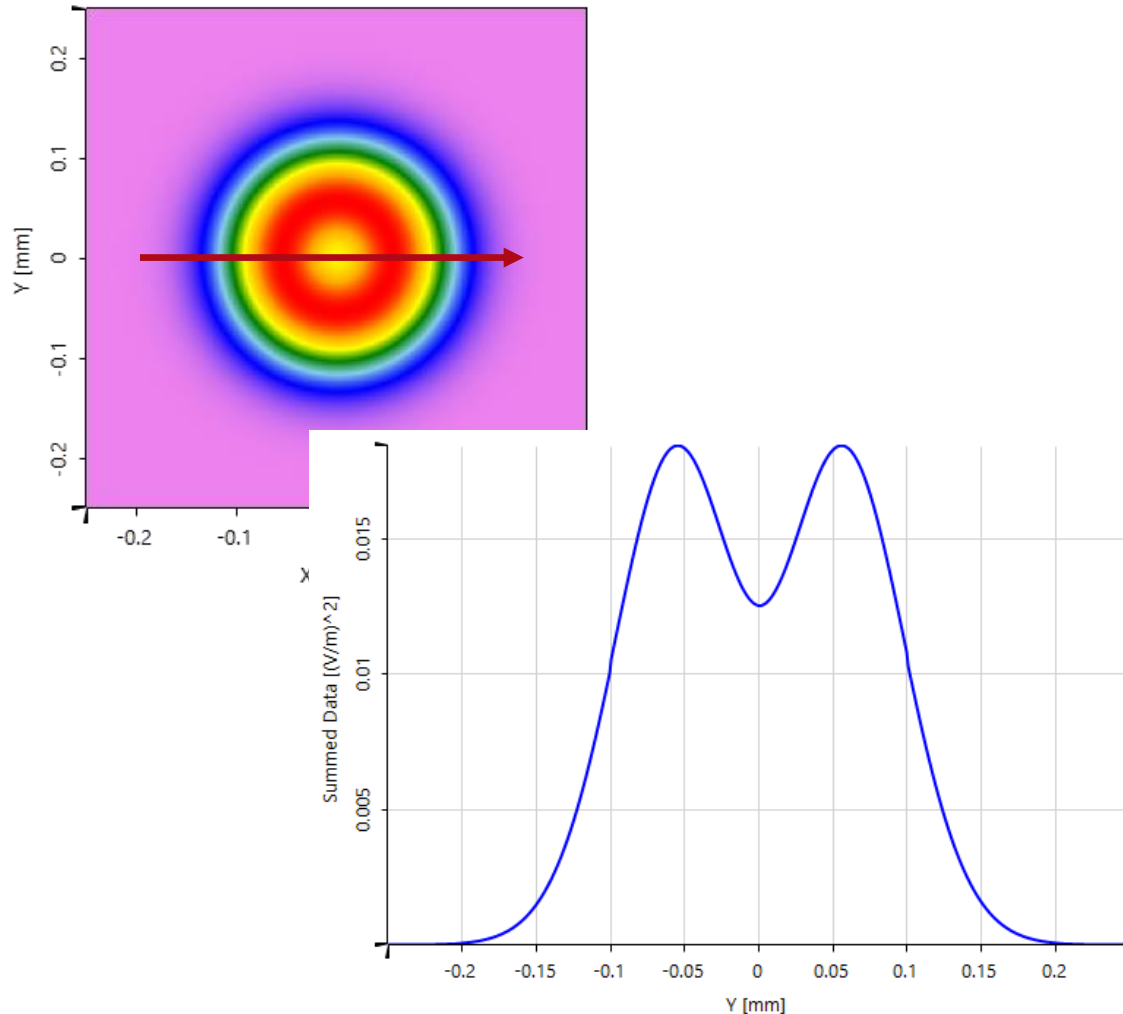


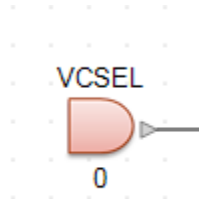
# **Modeling of a Vertical Cavity Surface Emitting Laser (VCSEL) Diode in VirtualLab Fusion**

# Abstract

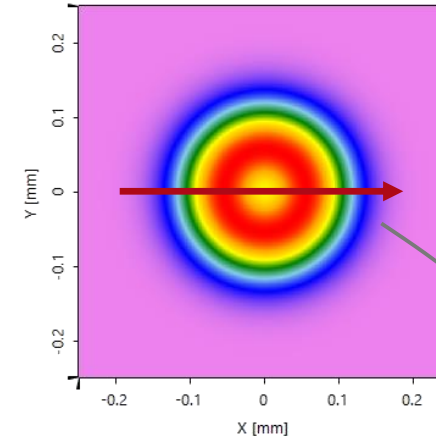


Vertical cavity surface emitting laser (VCSEL) diodes are of interest for numerous applications, such as optical sensors and pattern generators. In order to be able to investigate these kind of setups in VirtualLab an appropriate source model is required. In this document it is shown, how a VCSEL source can be configured in VirtualLab Fusion.

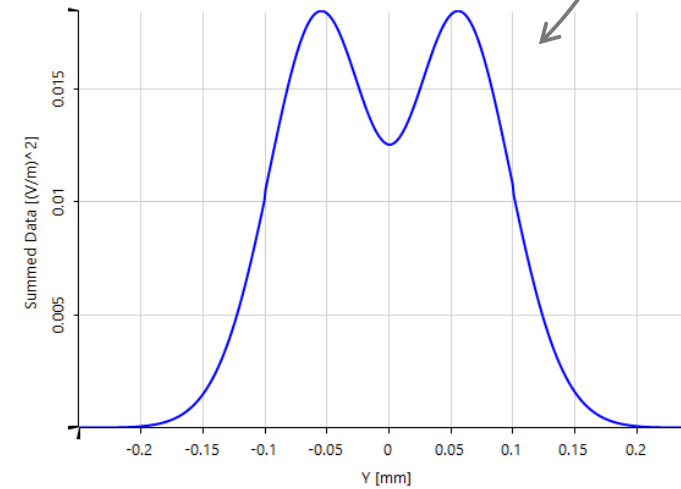
# Modeling Task



VCSEL diode  
central wavelength: 940nm  
half-angle divergence:  $11^\circ$

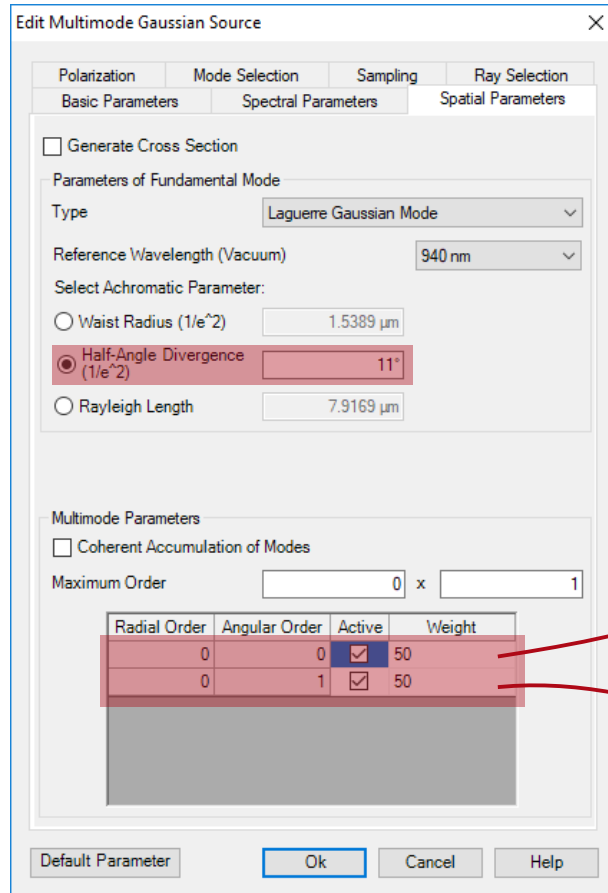


2D intensity

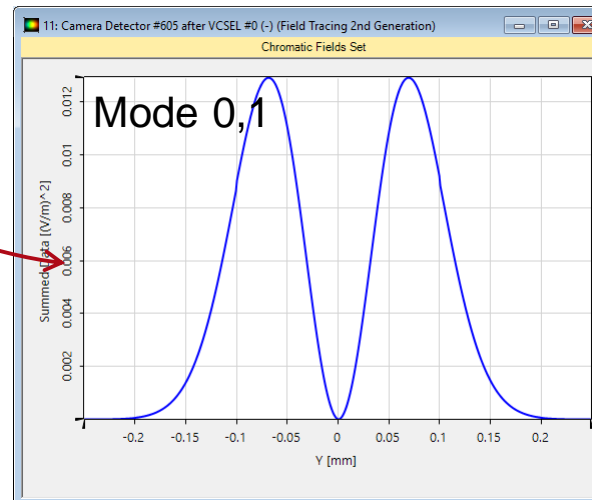
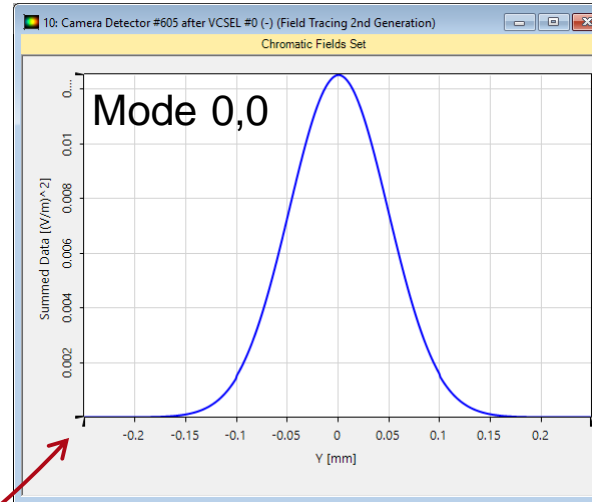


1D intensity profile

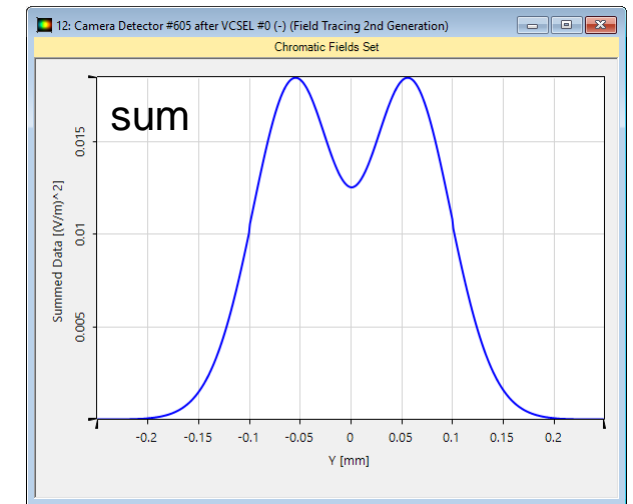
# Mode Decomposition for VCSEL Modeling



Multimode Gaussian Source is used to model the VCSEL



Two Laguerre Gaussian modes are combined in order to model the characteristic beam profile of a VCSEL

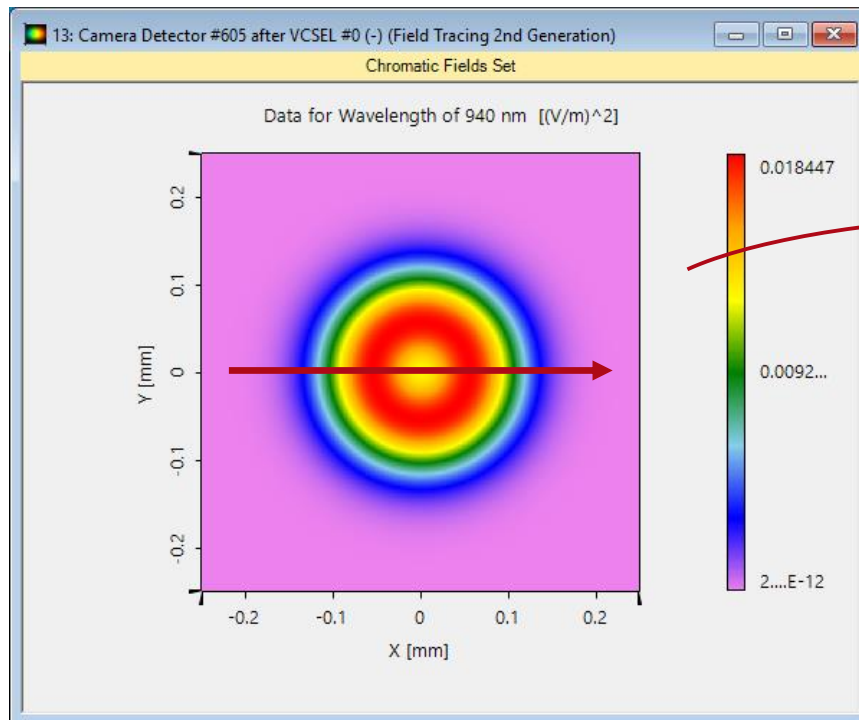


By adjusting the weights of the modes and e.g. divergence, almost every profile can be modeled.

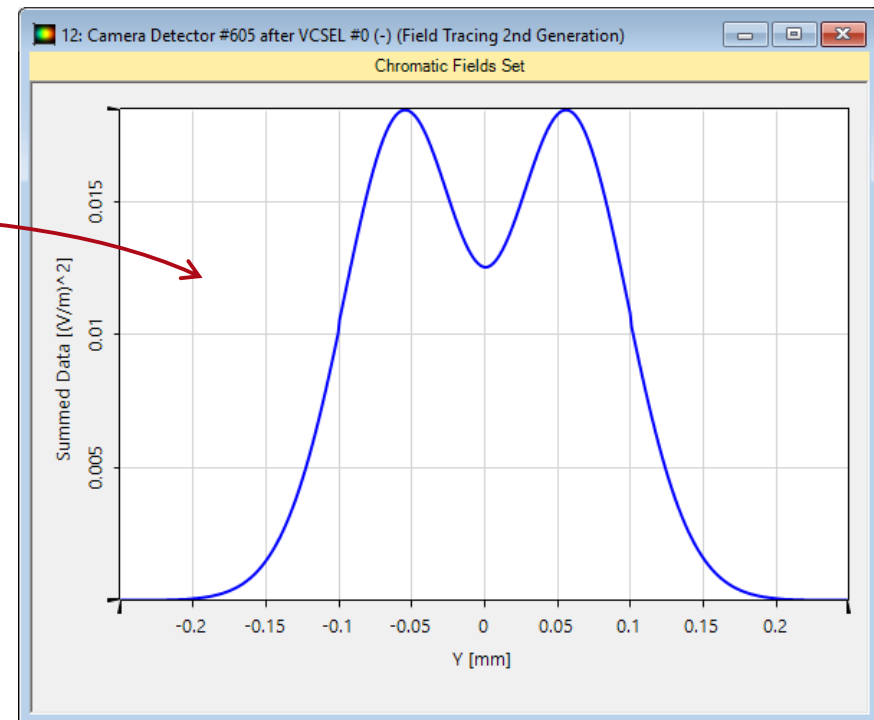
# Results

beam profile of the modeled VCSEL

2D intensity



1D intensity



# Workflow in VirtualLab

---

- Set up input Gaussian field
  - Basic Source Models

# Document Information

---

title	Modeling of a Vertical Cavity Surface Emitting Laser (VCSEL) Diode in VirtualLab Fusion
document code	tba
version	0.9
toolbox(es)	Starter Toolbox
VL version used for simulations	7.4.0.49
category	Application Use Case
further reading	-