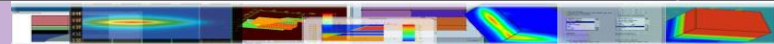



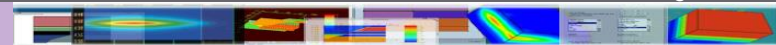
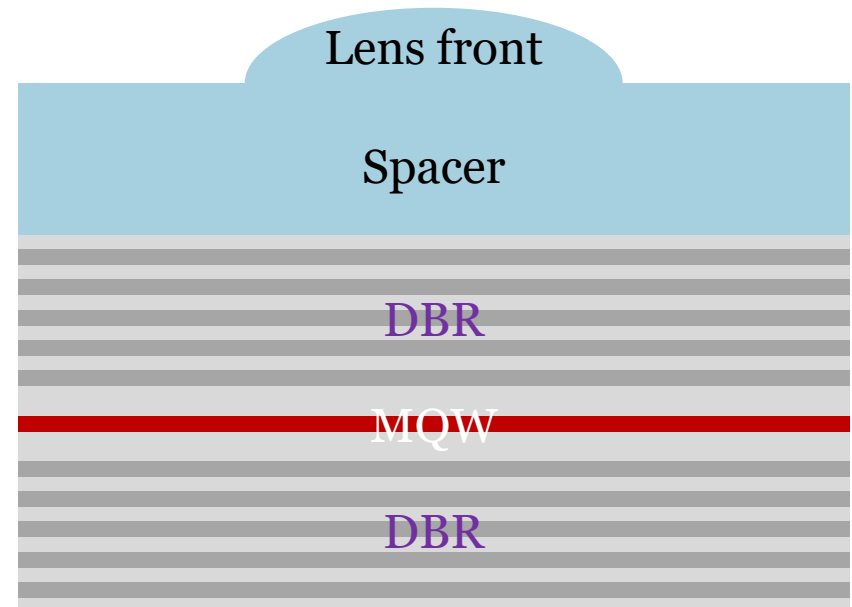
Analysis of microlens vertical-cavity surface-emitting laser




Structure

 The project is broken into two coupled analyses:

- VCSEL analysis
- Lens Analysis



Analysis

 The project is broken into two coupled analyses:

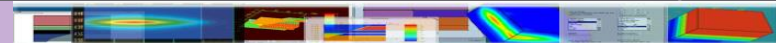
- VCSEL Analysis
- Lens Analysis

Generate Mesh (for the overall analysis)

VCSEL Analysis: Analyze VCSEL using the **Crosslight's PICS3D** full vectorial microcavity model

Lens Analysis: Use the **Crosslight's PICS3D** full vectorial propagation model to analyze the lens section

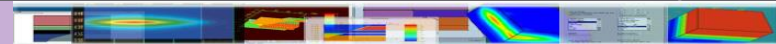
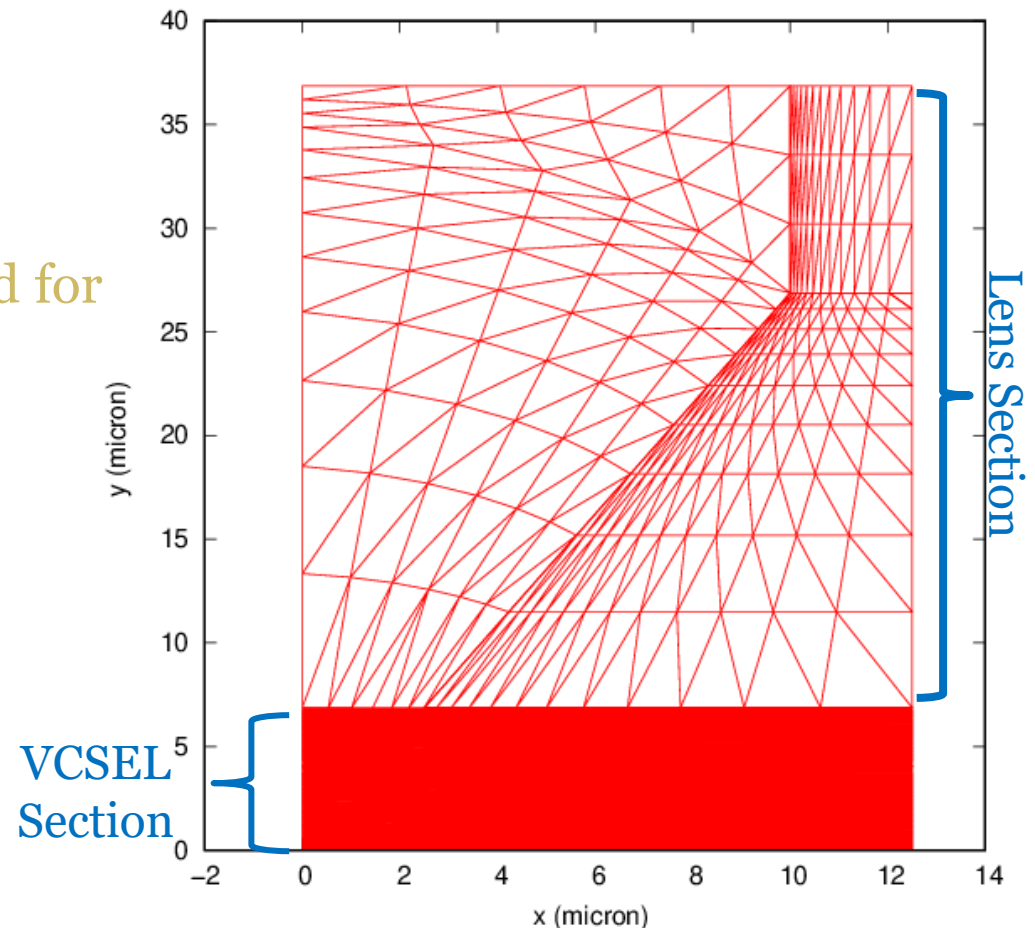
Post processing and display final results



Generate Mesh

PICS3D Analysis

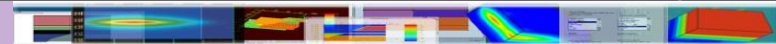
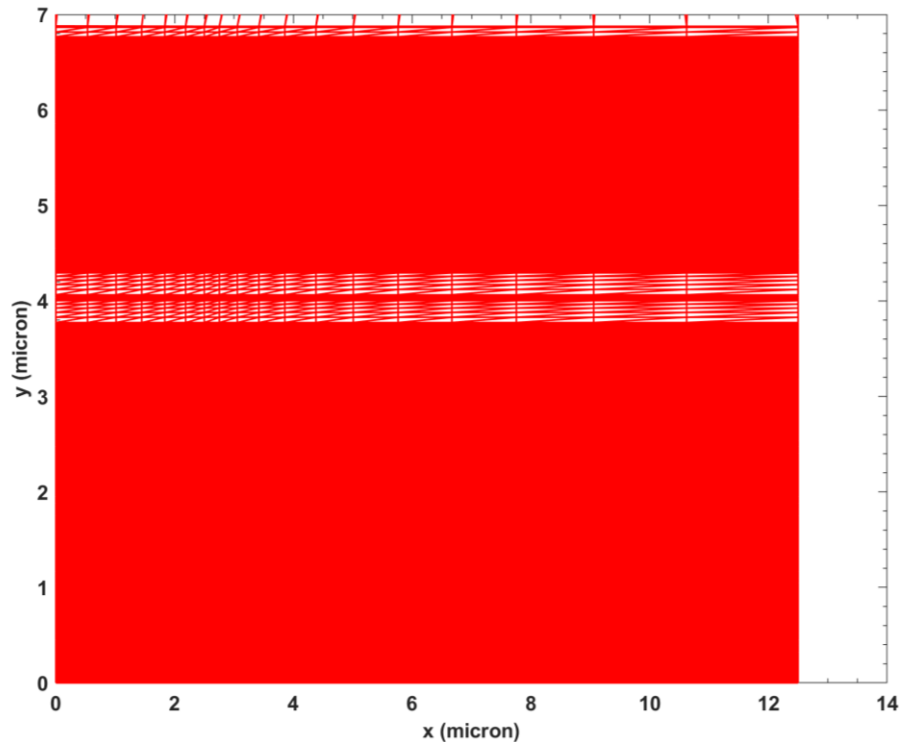
- Generate the mesh
 - The mesh is generated for the overall structure
 - VCSEL Mesh
 - Lens Mesh



Generate Mesh

PICS3D Analysis

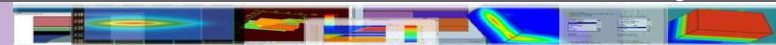
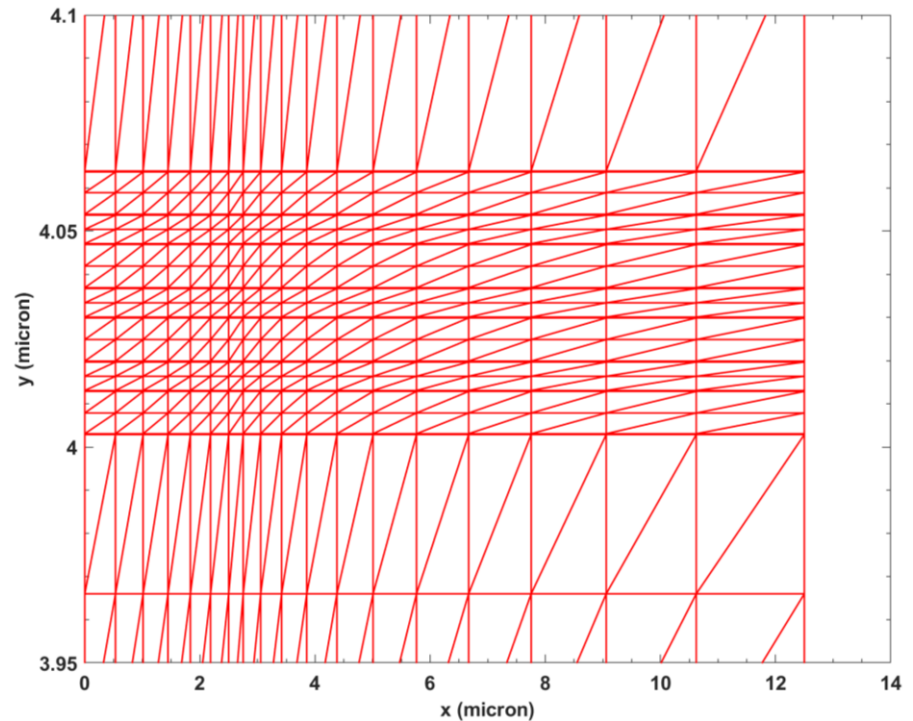
- Generate the mesh
 - The mesh is generated for the overall structure
 - VCSEL Mesh
 - A dense mesh is used for the VCSEL section



Generate Mesh

PICS3D Analysis

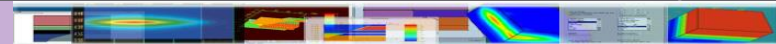
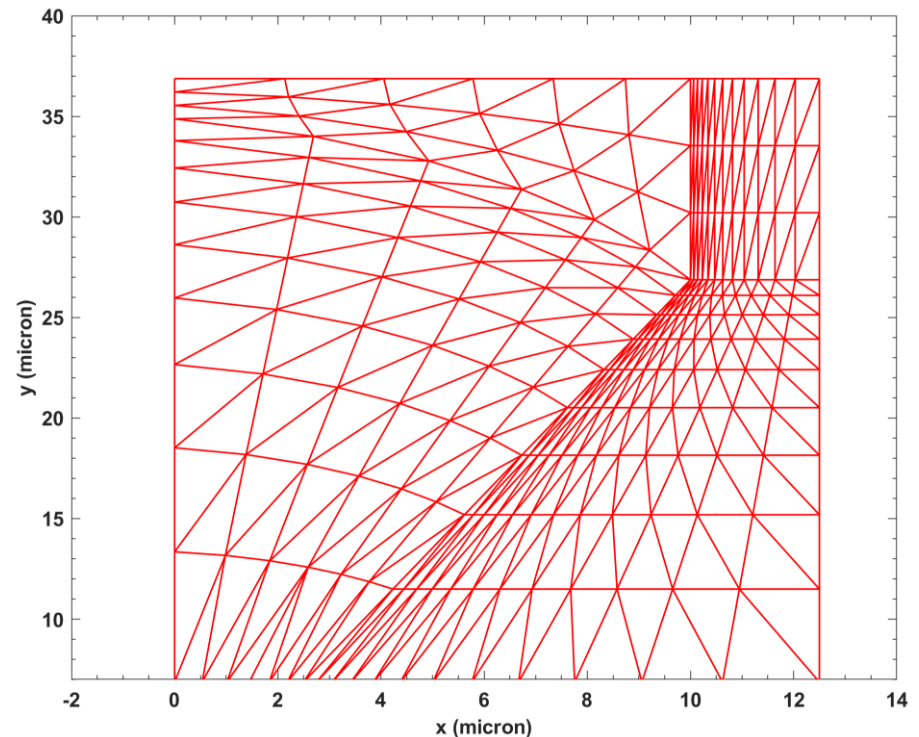
- Generate the mesh
 - The mesh is generated for the overall structure
 - VCSEL Mesh
 - A dense mesh is used for the VCSEL section
 - Zoom of MQW mesh



Generate Mesh

PICS3D Analysis

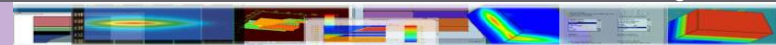
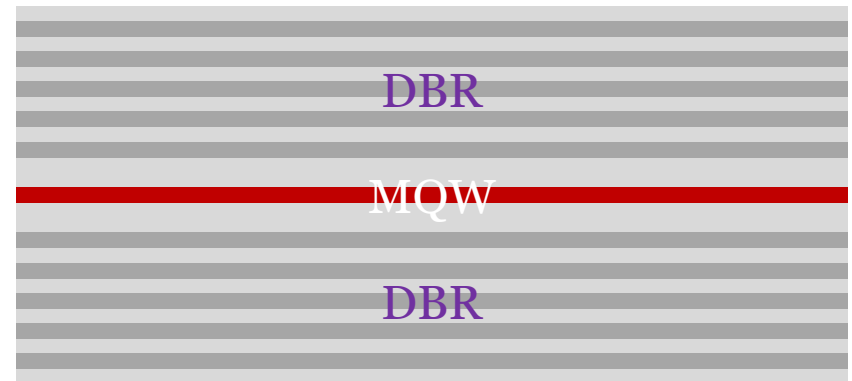
- Generate the mesh
 - The mesh is generated for the overall structure
 - VCSEL Mesh
 - Lens Mesh
 - A coarse mesh is used in the Lens section



VCSEL Analysis

PICS3D Analysis

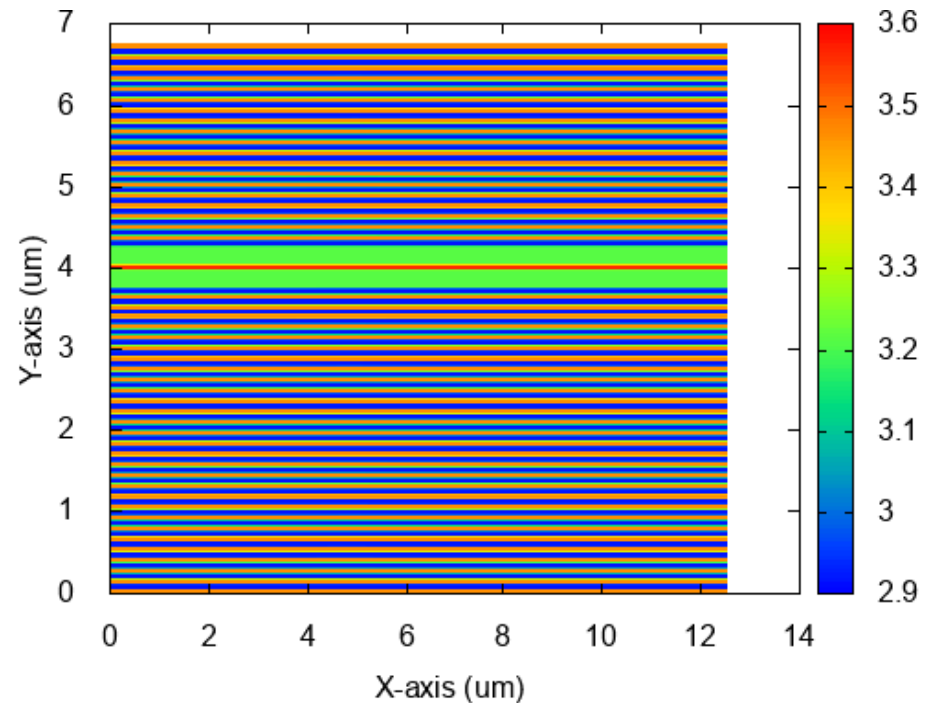
- Generate the mesh
- VCSEL analysis
 - The VCSEL is analyzed using the full vectorial microcavity model.



VCSEL Analysis

PICS3D Analysis

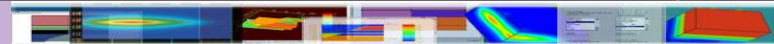
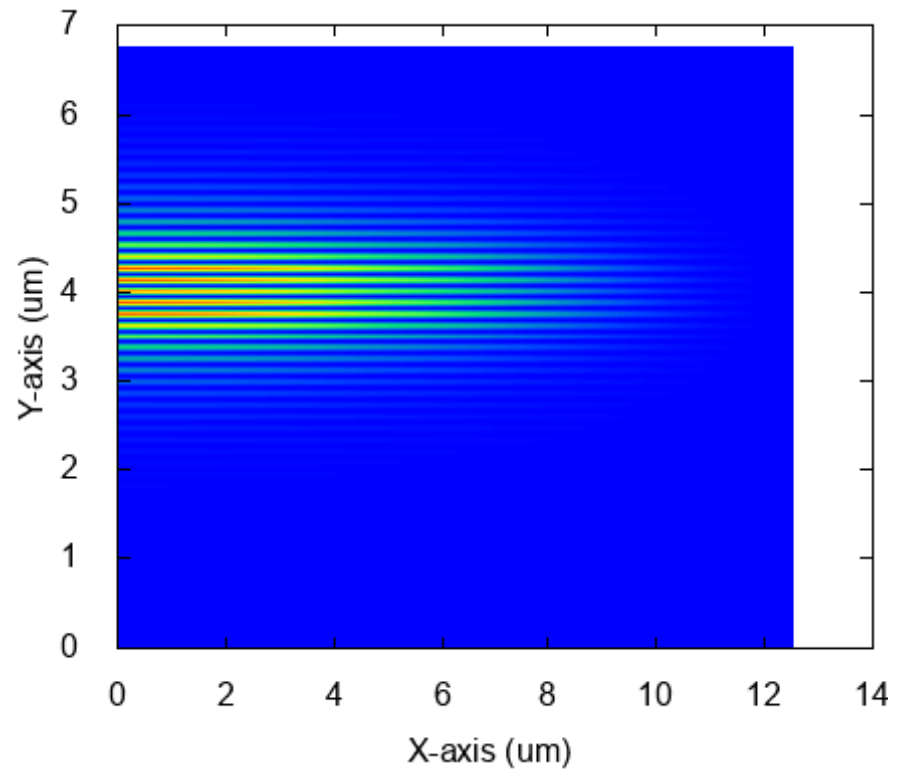
- Generate the mesh
- VCSEL analysis
 - The VCSEL is analyzed using the full vectorial microcavity model.
 - VCSEL Structure
 - Refractive Index profile



VCSEL Analysis

PICS3D Analysis

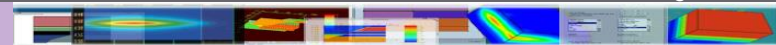
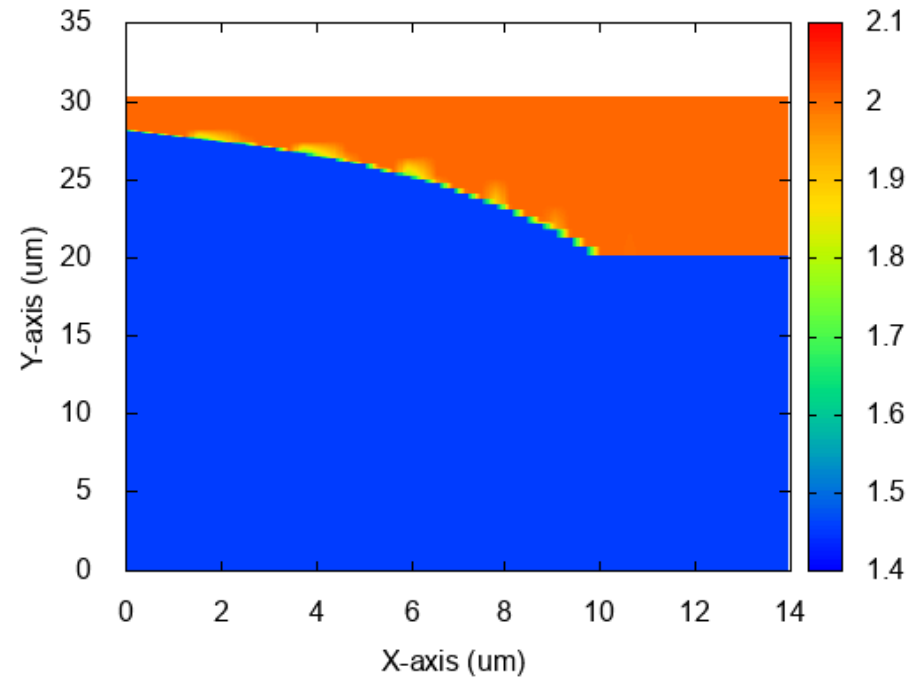
- Generate the mesh
- VCSEL analysis
 - The VCSEL is analyzed using the full vectorial microcavity model.
 - VCSEL Structure
 - Cavity Mode
 - Wave Intensity



Lens (propagation) Analysis

PICS3D Analysis

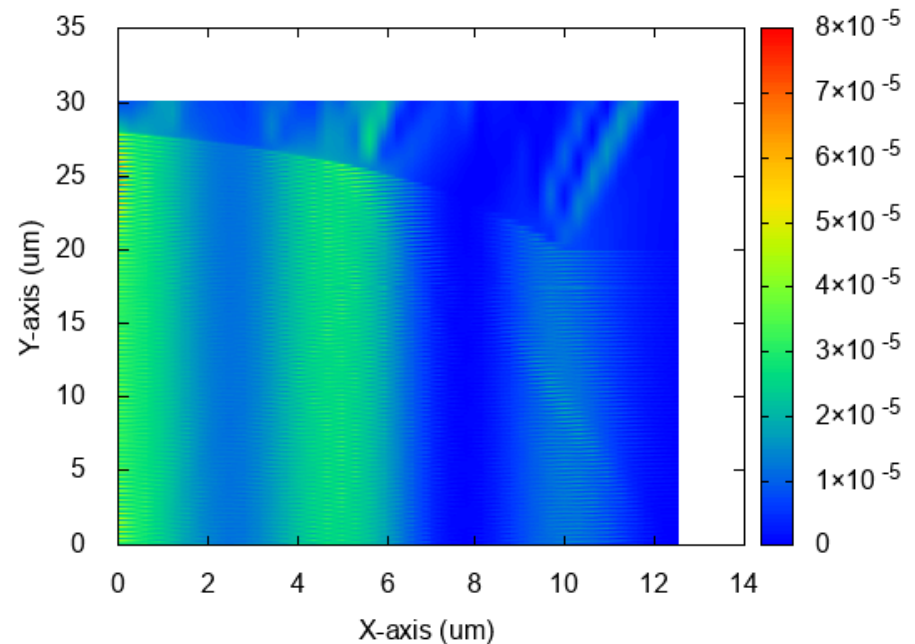
- Generate the mesh
- VCSEL analysis
- Lens analysis
 - Structure
 - Refractive Index Profile



Lens (propagation) Analysis

PICS3D Analysis

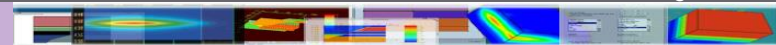
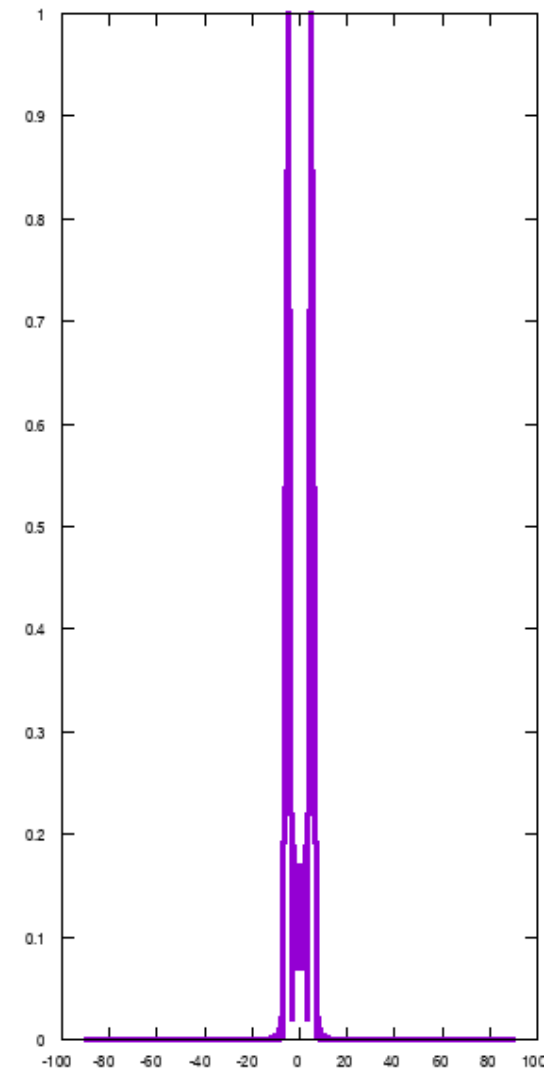
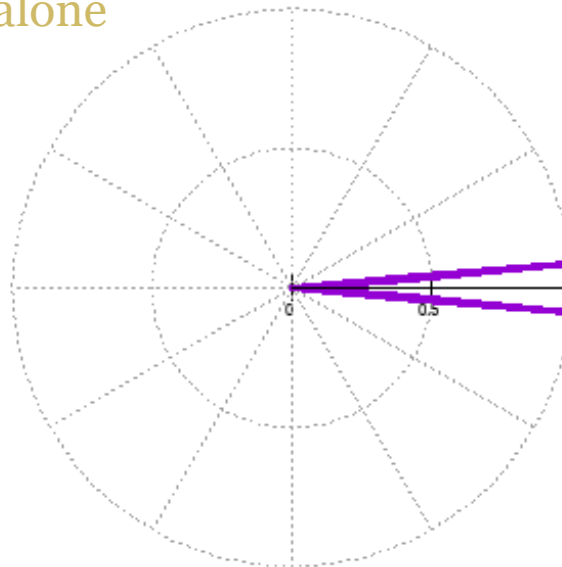
- Generate the mesh
- VCSEL analysis
- Lens analysis
 - Structure
 - Analysis
 - Wave Intensity



Post processing and Results

PICS3D Analysis

- Lens Effect
 - The effect of the lens is shown in the far field results
 - VCSEL cavity alone



Post processing and Results

PICS3D Analysis

□ Lens Effect

- The effect of the lens is shown in the far field results
- VCSEL cavity with microlens

