

**Rsoft Active Device Training  
Agenda**

**Session 1 – June 4<sup>th</sup> 2019 – 3 Hours**

**Slides :**

- Overview of the active devices which can be simulated in LaserMOD
  - Meshing of device cross-sections
  - Use of RSoft Mode Solvers
- Introduction of simulation methodology used by LaserMOD
  - Simulation flows
- Utilities involving LaserMOD

**Demo :**

- Review of RSoft CAD topics that apply to LaserMOD
  - Symbol Tables
  - Passive Materials
  - Mode & Index File passing (to/from Lasermod)
- Introduction to the LaserMOD CAD
  - Geometric Elements
  - Symbol Table Hierarchy
  - Active Materials
  - Use of RSoft Passive materials
- Meshing & Tiling
  - Use of Global and Local Mesh parameters
- Profile Generation
  - Index, doping, custom parameters
- Advanced LaserMOD CAD layout options
  - Alloy & Doping Profiles
  - Importing layer files
  - Coupled QWs (optional)
- Material Gain Calculation
  - Density/Temperature Sweep
  - Gain, PL, Index, Peak plots
  - Bulk vs QW
  - Gain Tables (optional)
  - Creating a Table (optional)

- Mode solving
  - Waveguide Modes: Ritz, BeamPROP™, FemSIM™
  - Cavity Modes: TMM, FemSIM™
  - Incident Fields: TMM
  - Importing Mode(s), Cavity Lifetime
- Bias Table
  - Steady-State
  - Transient
- Full active simulation
  - Model selection
  - Clearing old data
  - Recalculating the Gain/Modes
  - Threshold Bias
- Extracting Simulation Results
  - Standard Plots (extras)
  - Plot Dependencies
  - Custom Bias / Spatial / Energy Plots
  - Output options: FF orientation, axis, etc...
- Scanning of design parameters
  - Multi-variable scanning via scripting
- Advanced simulation techniques
  - Commonly used symbols not currently in the Dialogs
  - Convergence and re-meshing

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### Session – June 6<sup>th</sup> 2019 – 3 Hours

- FP Lasers (1D, 2D)
  - Waveguide Mode Calculation
  - Steady-State (Calibration)
  - Small signal (Frequency Response)
  - Large signal (Eye)
  - Self-Heating (Calibration)
- VCSELs (1D, quasi-3D)
  - Cavity Mode Calculation
  - Optical vs Full DBR
  - Alignment with Gain
  - Self-Heating (Calibration)
- DFBs
  - Cavity Mode Calculation
  - Alignment with Gain
  - Mode Competition
- External Cavity (optional)
- Micro Cavity (optional)

### Session – June 11<sup>th</sup> 2019 – 3 Hours

- Photodetectors
  - Reverse Bias
  - Surface normal
  - Responsivity
  - Frequency Response
  - Waveguide
  - Field Decay
- Modulators (FCA)
  - Frequency Response
  - MZM formulas
- Utilities that include active device simulate (optional):
  - Solar Cell Utility™
  - Multi-Physics Utility™, (FCA, EAM, transients)
  - Tapered Laser Utility™

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