



# Comsol Optical Waveguide Simulation

**Peipei Pang**



## **Comsol Optical Waveguide Simulation:**

*Optical Waveguides and Devices Modeling and Visualization Using COMSOL Multiphysics Volume 1* Hee Lim, 2018-10-19  
This pictorial manuscript is a step by step graphical illustrations for waveguides and devices modeling and computational physics simulation using COMSOL Multiphysics with Ray Optics Wave Optics and AC DC Electrostatics modules All the example models investigated and visualized with the help of Finite Element Analysis are referenced from the standard USA undergraduate text on Optical Guided Waves and Devices by Richard Syms and John Cozens The simulations include the use of geometrical ray tracings for point source and full electromagnetic waves source employing the Maxwell s wave equations for plane wave input Both 2D and 3D simulation results will help in visualize the electromagnetic field propagating inside the waveguides and devices Readers without fundamental handle on optics modeling are suggested to read the Optics Modeling and Visualization with COMSOL Multiphysics A step by step graphical instruction manuscripts for detailed discussion These models may be expanded to post graduate research and industrial photonics waveguides and devices development There are 46 chapters of different 2D and 3D optical waveguides devices structures modeled and simulated in Volume 1 and 2 Volume 1 models include 3D single mode optical fiber planar waveguide channel waveguide longitudinal and transverse phase modulator surface plasmon optical square waveguide tapered waveguide FTIR beamsplitter in ray tracing and electromagnetic wave solvers full prism coupler halved prism coupler plano convex overlay lens overlay Luneburg lens geodesic lens with control setup for resulted electric field comparison corrugated gratings transmission and reflection gratings chirped grating lens beam expander grating grating coupler chirped grating coupler buried channel waveguide Volume 2 models continue with the ridge channel waveguide strip loaded channel waveguide GaAs GaAlAs planar waveguide GaAs GaAlAs heterostructure waveguide radiation leaks at fiber bend radiation leaks at waveguide bend c axis Calcite polarizer waveguide integrated optic normal reflector horn channel waveguide Y Junction waveguide optical phase modulator cut off modulator electro optic Mach Zehnder interferometer waveguide parallel coupling waveguide electro optic directional coupler single polished fiber directional coupler double polished fiber directional coupler tunable coupling strength of polished double fiber coupler cross sectional coaxial fiber coupler 2D directional coupler with tapered coupling corrugated reflection gratings optical fiber grating on half polished fiber coupler and track changing reflector with grating assisted coupling fiber

*Optical Waveguides and Devices Modeling and Visualization Using COMSOL Multiphysics Volume 2* Hee Lim, 2018-10-20 This pictorial manuscript is a step by step graphical illustrations for waveguides and devices modeling and computational physics simulation using COMSOL Multiphysics with Ray Optics Wave Optics and AC DC Electrostatics modules All the example models investigated and visualized with the help of Finite Element Analysis are referenced from the standard USA undergraduate text on Optical Guided Waves and Devices by Richard Syms and John Cozens The simulations include the use of geometrical ray tracings for point source and full electromagnetic waves source employing the Maxwell s

wave equations for plane wave input Both 2D and 3D simulation results will help in visualize the electromagnetic field propagating inside the waveguides and devices Readers without fundamental handle on optics modeling are suggested to read the Optics Modeling and Visualization with COMSOL Multiphysics A step by step graphical instruction manuscripts for detailed discussion These models may be expanded to post graduate research and industrial photonics waveguides and devices development There are 46 chapters of different 2D and 3D optical waveguides devices structures modeled and simulated in Volume 1 and 2 Volume 1 models include 3D single mode optical fiber planar waveguide channel waveguide longitudinal and transverse phase modulator surface plasmon optical square waveguide tapered waveguide FTIR beamsplitter in ray tracing and electromagnetic wave solvers full prism coupler halved prism coupler plano convex overlay lens overlay Luneburg lens geodesic lens with control setup for resulted electric field comparison corrugated gratings transmission and reflection gratings chirped grating lens beam expander grating grating coupler chirped grating coupler buried channel waveguide Volume 2 models continue with the ridge channel waveguide strip loaded channel waveguide GaAs GaAlAs planar waveguide GaAs GaAlAs heterostructure waveguide radiation leaks at fiber bend radiation leaks at waveguide bend c axis Calcite polarizer waveguide integrated optic normal reflector horn channel waveguide Y Junction waveguide optical phase modulator cut off modulator electro optic Mach Zehnder interferometer waveguide parallel coupling waveguide electro optic directional coupler single polished fiber directional coupler double polished fiber directional coupler tunable coupling strength of polished double fiber coupler cross sectional coaxial fiber coupler 2D directional coupler with tapered coupling corrugated reflection gratings optical fiber grating on half polished fiber coupler and track changing reflector with grating assisted coupling fiber

**Methods and Applications for Modeling and Simulation of Complex Systems** Fazilah Hassan, Noorhazirah Sunar, Mohd Ariffanan Mohd Basri, Mohd Saiful Azimi Mahmud, Mohamad Hafis Izran Ishak, Mohamed Sultan Mohamed Ali, 2023-10-12 This book constitutes the refereed proceedings of the 22nd Asia Simulation Conference on Methods and Applications for Modeling and Simulation of Complex Systems AsiaSim 2023 held in Langkawi Malaysia during October 25-26 2023 The 77 full papers included in this book were carefully reviewed and selected from 164 submissions They were organized in topical sections as follows Modelling and Simulation Artificial intelligence Industry 4.0 Digital Twins Modelling Simulation and Gaming Simulation for Engineering Simulation for Sustainable Development Simulation in Social Sciences

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latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature

**Computational Photonics** Salah Obayya,2011-06-20 This book explores the state of the art in computational modelling techniques for photonic devices In this book the author provides a comprehensive coverage of modern numerical modelling techniques for designing photonic devices for use in modern optical telecommunications systems In addition the book presents the state of the art in computational photonics techniques covering methods such as full vectorial finite element beam propagation bidirectional beam propagation complex envelope alternative direction implicit finite difference time domain multiresolution time domain and finite volume time domain The book guides the reader through the concepts of modelling analysing designing and optimising the performance of a wide range of photonic devices by building their own numerical code using these methods Key Features Provides a thorough presentation of the state of the art in computational modelling techniques for photonics Contains broad coverage of both frequency and time domain techniques to suit a wide range of photonic devices Reviews existing commercial software packages for photonics Presents the advantages and disadvantages of the different modelling techniques as well as their suitability for various photonic devices Shows the reader how to model analyse design and optimise the performance of a wide range of photonic devices by building their own numerical code using these methods Accompanying website contains the numerical examples representing the numerical techniques in this book as well as several design examples [http://www.wiley.com/go/obayya\\_computational](http://www.wiley.com/go/obayya_computational) This book will serve as an invaluable reference for researchers optical telecommunications engineers engineers in the photonics industry PhD and MSc students undertaking courses in the areas of photonics and optical telecommunications will also find this book of interest

NASA Tech Briefs ,2004 Optoelectronic Materials and Devices for Optical Communications Shinji Tsuji,Jens Buus,Yi Luo,2005 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature

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Element Method FEM which can be used to model and simulate such components devices and analyze how they will behave in response to various outside influences This resource provides a comprehensive description of the formulation and applications of FEM in photonics applications ranging from telecommunications astronomy and sensing to chemistry imaging and biomedical R D This book emphasizes practical problem solving applications and includes real world examples to assist readers in understanding how mathematical concepts translate to computer code for finite element based methods applicable to a range of photonic structures In addition this is the perfect support to anyone using the COMSOL Multiphysics RF Module *Journal of the Physical Society of Japan* ,2017

## **Comsol Optical Waveguide Simulation** Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Comsol Optical Waveguide Simulation**," published by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we will delve in to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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