

How to simulate a COMSOL fiber optic sensor



Overview

In this video, we demonstrate a step-by-step simulation of Single Mode Optical Fiber using COMSOL Multiphysics. You'll learn how to model the fiber structure, set up boundary conditions, select appropriate physics (like Electromagnetic Waves, Frequency Domain), and. The transmission speed of optical waveguides is superior to microwave waveguides because optical devices have a much higher operating frequency than microwaves, enabling a far higher bandwidth. We also learn about COMSOL's 'Parametric Sweep' technique to vary the bending radius over a range and study how the different values of bending radius affect the modes. We. In this second video of the PCF-based SPR sensor series, we explain how to start COMSOL Multiphysics and build the complete geometry of a Photonic Crystal Fiber (PCF) based Surface Plasmon Resonance (SPR) sensor. The main purpose of the presented numerical modelling results is developing a simple.



Article Content

Hot

A Study of Optical Sensor Based on Fiber Bragg Grating Using ...

Fiber optic sensors can measure a large range of physical, chemical and environmental variables such as temperature, pressure, shape, position, chemical concentration, moisture, etc. Fiber optic sensors

Aug 09, 2025 Hot

Study of Photonic Crystal Fiber Modeling using COMSOL for Sensor

Abstract Abstract: This paper describes the study of photonic crystal fiber structure modeling for optical fiber sensor design using COMSOL Multiphysics simulation software. The use of photonic crystal

Dec 21, 2025 Hot

|COMSOL simulation| ||Single mode Fiber|| (SMF28e)

This is a tutorial video of a simulated fiber profile that gives an Electric field distribution of fundamental and Higher-order modes.

Feb 17, 2026 Hot

ORIGINAL ARTICLE Fiber Optic Based Pressure Sensor Using Comsol ...

ABSTRACT The sensing element of optical pressure sensor is used to measure the static or dynamic weight of the vehicle (i.e WIM system). In this paper reported here only the Designing and Analysis of

Mar 06, 2026 Hot

COMSOL ® Design Tool: Simulations of Optical Components Tutorial

Parameter selection: Manuel (and also select one of the modes) Create Line Graph Dataset: from parent and select the line segment in the fiber geometry Expression: $\text{emw}(\text{ewfd}).\text{normE}$

Feb 16, 2026 Hot

Single Mode Fiber Simulation using COMSOL Multiphysics |SMF| COMSOL

SMF stands for Single-Mode fibre. It is a type of optical fibre that is designed to carry a single mode of light propagation. In SMF, the core diameter is typically very small, typically around 8 ...

Oct 06, 2025 Hot

Modelling Of Optical Waveguide Using COMSOL Multiphysics

In this paper we investigate by simulation the dependence of the numerical aperture, normalized frequency and power propagating in the fibre, on the refractive index difference between the cladding

Mar 26, 2026 Hot

|D-Shaped Optical Fiber Surface Plasmon Resonance| ||COMSOL SIMULATIONS ...

(Part-5) Phase matching curve|| PCF-based SPR sensor Simulation Comsol || Optical Fiber Simulation #IEEE sensors 2020 # Poster presentation # Dr. Farhan Mumtaz # virtual conference #

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(Part-4) X shape PCF-based SPR sensor Simulation

This video is designed for beginners, researchers, and graduate students who want to learn how to convert a published research paper design

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Modeling and simulating of unclad fiber-optic biosensor based on ...

An unclad single mode fiber-optic sensor operating at 650 nm was designed and simulated by using COMSOL MULTIPHYSICS Finite Element Method and utilized the effect of

Dec 27, 2025 Hot

Design and Simulation of C-Shaped Optical Fiber Sensor

This paper presents a C-shaped optical fiber sensor for refractive index measurement. The design and simulation of the C-shaped optical fiber were conducted via Wave Optics Module-COMSOL

Mar 24, 2026 Hot

Microsoft Word

In-fiber grating-based sensors have many advantages over conventional electric and alternative fiber optic sensor configurations. They are relatively straight-forward, inexpensive to produce, immune to

Apr 08, 2026 Hot

#2 How to design a multi mode optical fiber (COMSOL ...

Hello Engineers, This video is about how to design a step-index multi-mode optical fiber and find the mode field profiles MDF at the wavelength of 1550 nm.

Sep 10, 2025 Hot

5 Essential Tips for Accurate Optical Simulations in

In this article, we will explore five key strategies to improve the reliability and efficiency of your optical simulations in COMSOL.

Mar 23, 2026 Hot

[|| How to simulate multimode optical fiber \(MMF\) in COMSOL || || Part](#)

PART - 1: This tutorial consists of two parts: #Part 1 of the video includes fiber parameter, fiber geometry and selection of material properties and the rest ...

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[\(a\) Model built in COMSOL Multiphysics; \(b\), \(c ...](#)

Download scientific diagram | (a) Model built in COMSOL Multiphysics; (b), (c) response of vibration signal by theoretical simulation: (b) several given accelerations, (c) different acceleration ...

Jul 28, 2025 Hot

[Modelling Of Optical Waveguide Using COMSOL Multiphysics](#)

Multiphysics®. Keywords –single mode fibre, optical waveguide, refractive index difference, NA, COMSOL 1. Introduction Optical fibre systems today generate a great interest and have various

Oct 22, 2025 Hot

[Single Mode fiber simulation on COMSOL](#)

In this video, we demonstrate a step-by-step simulation of Single Mode Optical Fiber using COMSOL Multiphysics.

Mar 28, 2026 Hot

[A Study of Optical Sensor Based on Fiber Bragg Grating Using](#)

The effect of environmental parameters on the composite material machine part is observed by the modification of the length of the Fabry-Perot interferometer formed by two Bragg grating mirrors. This

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[Study of Photonic Crystal Fiber Modeling using COMSOL for Sensor](#)

using COMSOL Multiphysics simulation software. The use of photonic crystal fiber enhances the phase matching between optical fiber core guided modes and plasmon modes. PCF brings new strength to

Jan 12, 2026 Hot

[Optical Fiber Simulator App](#)

Analyze step-index and graded-index fibers with an app to perform mode analyses on the dielectric layer structures. Get the Optical Fiber Simulator now.

Feb 20, 2026 Hot

(Part-3) PCF-based SPR sensor|| Optical Fiber

This video is designed for beginners, researchers, and graduate students who want to learn how to convert a published research paper design

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Step-Index Fiber Simulation | COMSOL Blog

A step-index fiber is an optical fiber with a step-index profile. Fiber optics revolutionized communication with more applications to come.

Oct 23, 2025 Hot

(Part-3) PCF-based SPR sensor|| Optical Fiber Simulation Comsol

In this second video of the PCF-based SPR sensor series, we explain how to start COMSOL Multiphysics and build the complete geometry of a Photonic Crystal Fi...

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Fibre Optical Coupler Simulation by Comsol

The paper presents a simulation model developed for a special optical coupler intended for coupling radiation from signal and pump sources used for the

Apr 06, 2026 Hot

#1 How to design Single mode fiber optic using (COMSOL ...

Hello Engineers, This is the first video in the channel and it is about how to design a step-index single-mode optical fiber and find the mode field profiles at the wavelength of 1550 nm.

Nov 21, 2025 Hot

Microsoft Word

Using kinetic parameters, produced by our experimental measurements, in our numerical model enables us to demonstrate the potential of fiber optic SPR sensor for biological analysis purposes. Keywords:

Oct 10, 2025

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.eedenmarketing.co.za>

Email: info@moletenare-ew.co.za

Phone: +86 138 1658 3346

Address: Ningbo, China

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