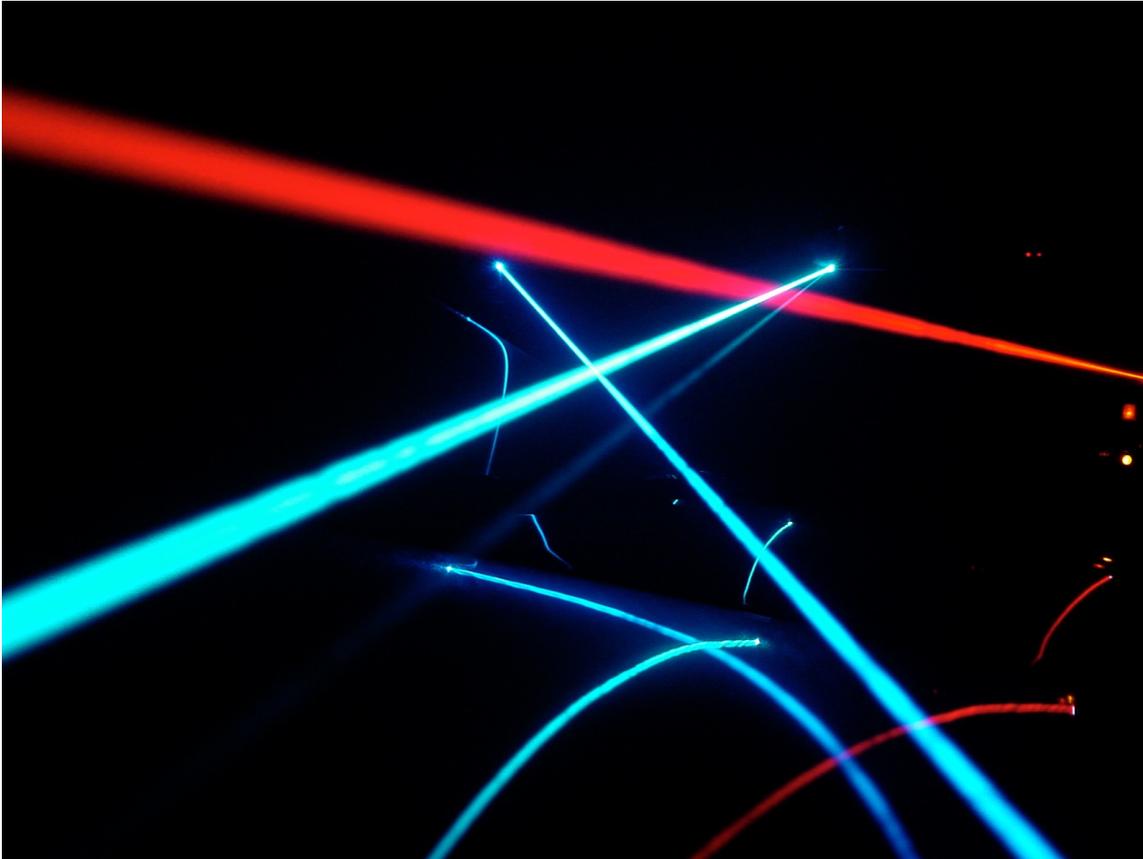


Understanding Lasers and Fiberoptics

Shaoul Ezekiel



Lasers are essential to an incredibly large number of applications. Today, they are used in bar code readers, compact discs, medicine, communications, sensors, materials processing, computer printers, data processing, 3D-imaging, spectroscopy, navigation, non-destructive testing, chemical processing, color copiers, laser "shows", and in the military. There is hardly a field untouched by the laser. But what exactly is so unique about lasers that makes them so effective?

This brief video course is designed for engineers, scientists, medical personnel, managers, and others who work with lasers and/or fiberoptics, or who anticipate working with lasers and/or fiberoptics, yet have little or no background in laser or fiberoptic basics. The course focuses on fundamentals and emphasizes a physical intuitive interpretation of laser and fiberoptic phenomena and their applications. Because Prof. Ezekiel keeps mathematics to a minimum, the topics covered are easily understood, without the need for a strong technical background. Prof. Ezekiel uses plain language,

graphic illustrations, and video demonstrations to explain the basic characteristics of lasers and fiberoptics.

Topics covered in the videos include:

- Why the interest in lasers
 - Unique characteristics of lasers
 - How such characteristics come about
 - How a laser is constructed
 - What determines the laser's power, intensity, energy, wavelength, spot size, collimation, tuning range, spectral width, efficiency, size and weight
 - Generation of very short pulses
 - What are the problems with lasers and how to handle them
 - Types of lasers, including gas lasers, solid-state lasers, semiconductor lasers, and liquid lasers
 - Examples of laser applications
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- Why the interest in fiberoptics
 - How light propagates in an optical fiber
 - What determines the loss in a fiber
 - Single mode and multimode propagation
 - Single polarization fiber
 - Fiber amplifier operation
 - Fiberoptics applications in sensors and communications
 - Future developments

Videos

TOPICS	VIDEOS
Laser Fundamentals I	(RM - 56K) (RM - 220K)
Laser Fundamentals II	(RM - 56K) (RM - 220K)
Laser Fundamentals III	(RM - 56K) (RM - 220K)
Laser Fundamentals III (cont.)	(RM - 56K) (RM - 220K)
Fiberoptics Fundamentals	(RM - 56K) (RM - 220K)

High quality versions of the videos below are also available through [Zeelase](#).

These videos were produced by the MIT Center for Advanced Engineering Study.

This resource may be useful with the following MIT OpenCourseWare courses:

- [2.71/2.710 Optics, Fall 2004](#)
- [2.717J/MAS.857J Optical Engineering, Spring 2002](#)
- [6.161/6.637 Modern Optics Project Laboratory, Fall 2005](#)
- [6.637 Optical Signals, Devices, and Systems, Spring 2003](#)
- [8.03 Physics III, Spring 2003](#)
- [8.03 Physics III: Vibrations and Waves, Fall 2004](#)

Recommended Citation

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