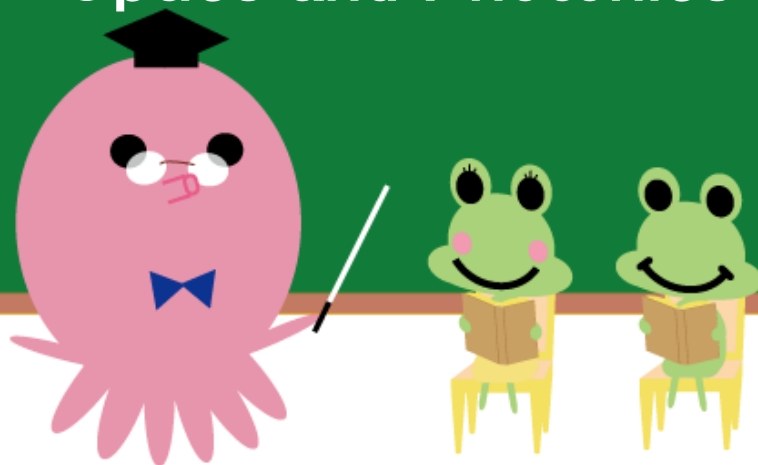


# リことパス

理工学図書館パスファインダー

Applied Physics and precise science

## Optics and Photonics



リことパスは、主に理工学分野の授業に関連するトピックについて、学習の初めの一步になる資料やWebサイトを紹介するテーマ別調べ方ガイドです。作成は理工学図書館のティーチング・アシスタント(TA)です。学習やレポート作成に活用してください。

In this chapter I will be giving some basic material to study Optics and nano-photonics.

# 1. Introduction

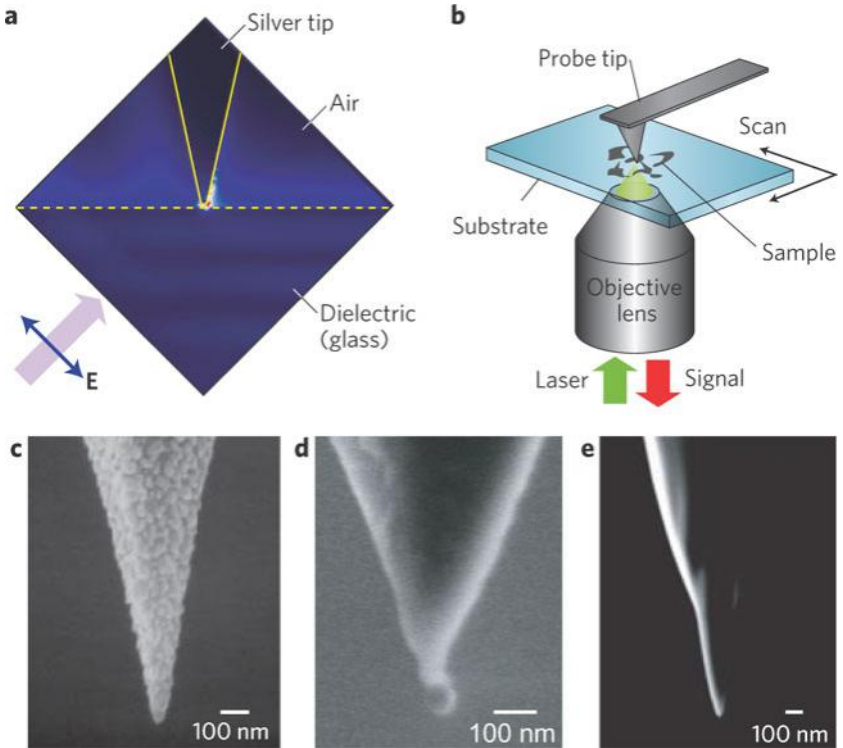


Nano-technology is the world of “nanometer” by using light of micro-scale wave-length. Going beyond the diffraction limite of light, Optics and Photonics is a science to study or create new phenomena using the interaction of photons with nanomaterials in other words the application of light-based science.

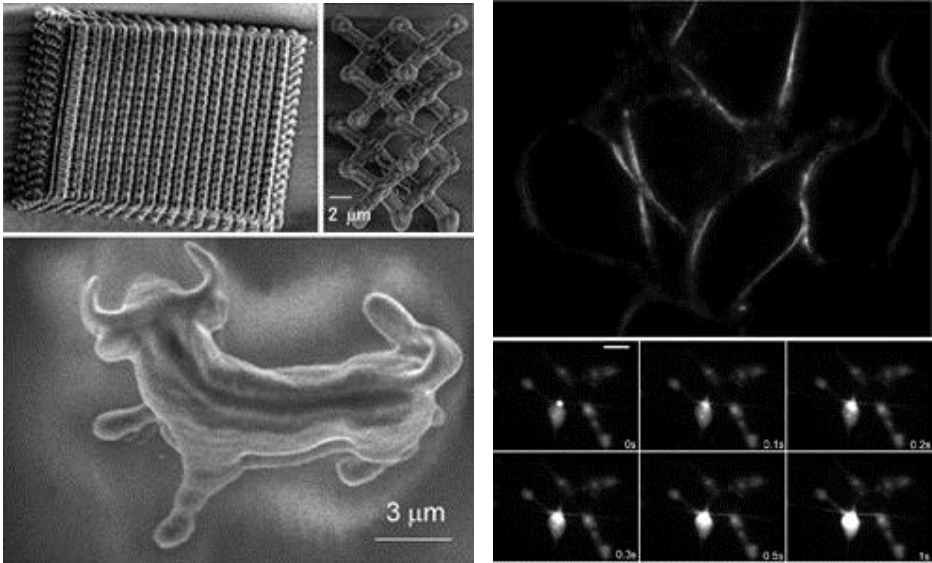
The application and development varies from fibers telecommunication to microscopy for example:

## Nanophotonics

**a**, Numerical calculation of light distribution at the apex of a metallic nano-tip shows **b**, A typical set-up for apertureless NSOM using a tip. Image is obtained by scanning the sample stage. **c-d-e** nano-tips.



Photopolymerizable resin allows the creation of photonic crystals (top two images) and the world's smallest bull (lower image). The right illustration is a Second harmonic generation image of cultured cells (top), and laser-induced cytosolic calcium wave (bottom).



LaSIE. <http://lasie.ap.eng.osaka-u.ac.jp/whatslasie.html>, (accessed 2012-07-06)

## 2. Material



### 2-1. Book

#### ■ *Near-field optics and surface plasmon polaritons* / Satoshi Kawata (ed.)

【CODE=2003416135】 Sci. & Eng. Lib.: East Building 1F Books 428/KAW

This book describes the physics behind near field optics and localized surface plasmon polaritons (SPPs) in metallic structures and mie scattering. It gives also the general concept of near-field probes family for NSOM. In addition, there is also a description of surface enhance raman spectroscopy and tip enhanced raman spectroscopy using aperture and apertureless probes, and laser trapping.

#### ■ *Nanophotonics with surface plasmons* / edited by V.M. Shalaev, S. Kawata

【CODE=2004046998】 Sci. & Eng. Lib.: West Building 2F Books 549.95/SHA

This book describes nano-photonics and surface plasmons and shows some of its applications, such as Metal strip and wire waveguides of SPPs, super resolution microscopy using SPPs, and biosensing with plasmonic nano-particles.

■ ***Nano-optics / Satoshi Kawata, Motoichi Ohtsu, Masahiro Irie (eds.)***

【CODE=2003469675】 West Building 2F Books 549.95/NAN

This book describes the development of imaging-contrast mechanisms as a result of photon and nano-materials interactions. There is also the description of Quantum theory for near field nano-optic, electromagnetism theory and analysis for near-field optics, and high density optical memory and photo-fabrication.

■ ***The quantum theory of light / Rodney Loudon***

【CODE=2000037408】 Sci. & Eng. Lib.: East Building 1F Books 425.1/LOU

This book describes the basic theory behind the properties of light and its interactions with atoms, some quantum-optical experiments, as well as some experiments in quantum optics. And it also covers the Einstein coefficients, photon optics, and nonlinear optics.

2-2. Web

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■ ***LaSIE: Laboratory for Scientific Instrumentation and Engineering (Osaka-univ.)***

<http://lasie.ap.eng.osaka-u.ac.jp/whatslasie.html>

■ ***Wikipedia***

“Photonics” [http://en.wikipedia.org/wiki/Photonics#Overview\\_of\\_photonics\\_research](http://en.wikipedia.org/wiki/Photonics#Overview_of_photonics_research)

“Optics” <http://en.wikipedia.org/wiki/Optics>

“Plasmonics” <http://en.wikipedia.org/wiki/Plasmonics>

3. Contact



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