

Physics 564 (ECE 564), Laser Physics II
Mondays and Wednesdays, 15:30:00 to 16:45 pm, tentatively PAIS Room 1140
Fall 2023

Instructor

Jean-Claude Diels
Physics & Astronomy room PAIS 2236, phone 277 4026
CHTM, room 114A, phone 272 7830
email: jcdiels@unm.edu

Topics covered

MANIPULATION OF LASER BEAMS

Polarization - in Pump-probe experiments time resolved fluorescence
How good can you maintain polarization?
Faraday rotation - isolators Magnetic field detection
Spectral interferometry – How to make a movie of a plasma

Standard solid state lasers

Vanadate - Nd YAG glass Yb YAG LISAF LICAF
Multilevel coherent interactions
Application to Raman transitions
Brillouin scattering
Is there anything such as backward Raman scattering?
Lab Demo

BIG SYSTEMS

Short pulse amplification from GW to TW to PW
Contrast enhancement

Optical Parametric Oscillator (OPO); PPLN

Optical Parametric Chirped Pulse Amplification (OPCPA)
PPLN

LASER INDUCED PLASMA

Electron plasma
Plasma mirrors
Making gratings in air without plasma
Z-pinch diagnostic

LASER COOLING

SEMICONDUCTOR LASERS

Junction, VECSEL,

FIBER LASERS

Integrated optics lasers

SENSOR APPLICATIONS

Intracavity sensing

quantum limit of noise

Squeezing

Gravitational waves detection

Lab demo

THZ radiation

X-Ray generation

Attosecond pulses