
PHY6347

Electromagnetic Theory II

Spring 2020

Period 6 (12:50 PM - 1:40 PM)

Instructor: Dmitri Maslov

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Office: NPB 2114

Office hours:

Wed 3:00 p.m.-4:00 p.m.

Thu 3:00 p.m.-4:00 p.m.

or by appointment

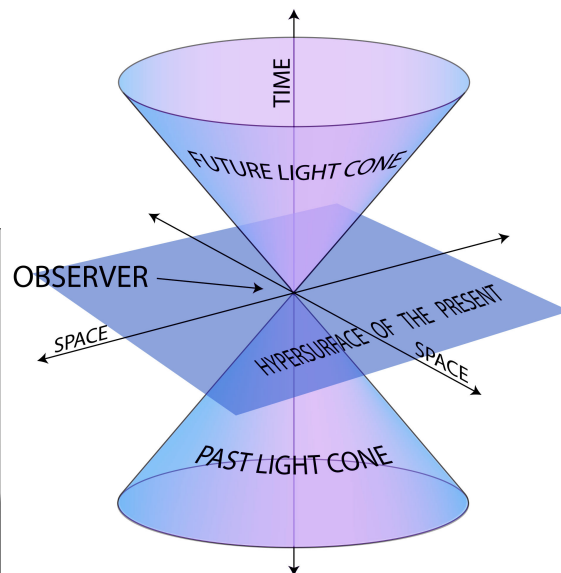
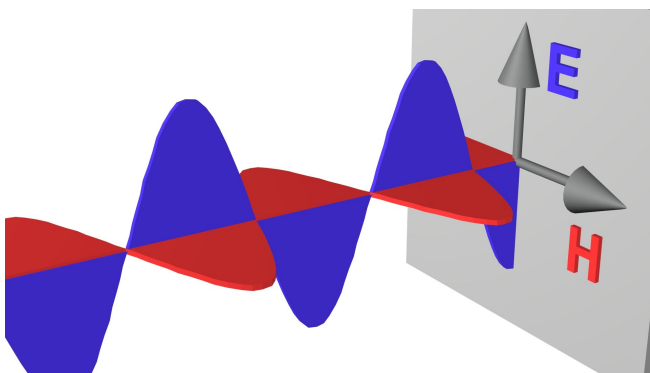
Grader: TBA

e-mail:

Office:

Office hours:

All materials for this class will be posted at [UF e-learning](#) . Enter with your Gatorlink login and password.



Overview

PHY 6347 is the second semester of the graduate core sequence in Electromagnetism. The objectives of the course are (i) to study electrodynamics at a theoretically sophisticated level; (ii) to develop mathematical techniques useful for solving problems in E&M as well as other areas of physics; (iii) to develop problem solving skills; (iv) to prepare the student (if necessary) for the preliminary exam. Topics to be covered include

- Time-dependent Maxwell equations: conservation laws, energy density, energy flux (Poynting vector), momentum density, momentum flux (Maxwell stress tensor)
- Plane waves, propagation and dispersion
- Confined geometries: waveguides, cavities, dielectric waveguides/fibers, losses and attenuation
- Radiation from harmonic sources: dipole and higher multipoles, linear antenna, vector spherical harmonic expansion
- Scattering and diffraction
- Special relativity: Lorentz transformations, space-time vectors and tensors, proper time, velocity and acceleration as 4-vectors, energy-momentum, covariant formulation of electromagnetism
- Radiation from accelerated charges; Cherenkov and synchrotron radiation, radiation losses

Coursework

Weekly homework (50% of the grade), due every Friday by 5 p.m.

Two exams (25% each)

Disclaimer

University Policies: Students are expected to know and comply with the University's policies regarding academic honesty and use of copyrighted materials. Cheating, plagiarism, or other violations of the Academic Honesty Guidelines will not be tolerated and will be pursued through the University's adjudication procedures.

Students requesting classroom accommodations must first register with the Disabilities Resources Program, located in the Dean of Students Office, P202 Peabody Hall. The Disabilities Resources Program will provide documentation to the student, who must then deliver this documentation to the instructor when requesting accommodations.

Materials

- **Main text:**
- A. Zangwill, Modern Electrodynamics
- **Supplemental texts:**
- J. D. Jackson, Classical Electrodynamics, 3rd ed
- L. D. Landau and E. M. Lifshitz, The Classical Theory of Fields (Landau Course of Theoretical Physics, v.2)
- L. D. Landau and E. M. Lifshitz, Electrodynamics of Continuous Media (Landau Course of Theoretical Physics, v.8)

Important dates

No classes:

January 8 and 10 (Maglab Winter Theory School)

January 20 (Martin Luther King Jr. Day)

March 2-6 (UF Spring break)

Exams

1. February 25
2. TBA