



PHYS 790-D: Charged-particle beams and waves (fields) interactions (Fall 2014)

Home

[Home](#) [Syllabus](#) [Homeworks](#) [Lecture Notes & Useful Materials](#)

Instructor: Philippe PIOT (piot@nicadd.niu.edu), [WWW](#)

Office: La Tourette Hall rm 226

Office hours: Tuesdays and Thursdays 8:30 am to 1:00 pm

Class meeting: Tuesdays and Thursdays 9:30 am to 10:45 am

Location: Faraday Hall 237

Textbook: None, lecture notes will be provided.

Last updated: Sept. 1st, 2014

Course catalogue description

This course will discuss basics of charged-particle beams and wave interactions and their use in a variety of applications: radiofrequency particle accelerators and electron sources, radiofrequency power generators, free-electron lasers, laser-based and self-field acceleration techniques, and other assorted "exotic" topics. Some knowledge of electromagnetism, electrodynamics, and classical mechanics is desired and will be reviewed as necessary (all within 1st of graduate studies). Some formalism on charged-particle beams (phase space, statistical descriptions, etc...) and electromagnetic wave and laser (Wigner function, Gaussian and Fourier optics) description will also be introduced. One of the goals of this course is to make a connection between particle and photon beams formalism and their interplay when discussing the interaction between these two classes of beams. The class is not intended to be a comprehensive beam physics class in the sense that only needed beam-physics concepts will be introduced. The course will provide an overview of forefront researches being carried in beam physics and connect them with classical mechanics and electromagnetism formalisms.

Grading

Homework = 50 %, Midterm = 20 % Final = 30 %. Midterm exam will be closed book examinations. Final exam will be a take home project that will be presented at the last class with a report returned during the final's week. The following scales are use for the final (letter) grades:

A : > 85%

A-: > 80%

B+: > 75%

B : > 70%

B-: > 65%

C+: > 60%

C-: > 50%

C : > 40%

F : < 40%

Accessibility

If you need an accommodation for this class, please contact the Disability Resource Center (RDC) as soon as possible. The DRC coordinates accommodations for students with disabilities. It is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu. Also, please contact me privately as soon as possible so we can discuss your accommodations. The sooner you let us know your needs, the sooner we can assist you in achieving your learning goals in this course.

News

09/01/2014: room change

the class location is permanently changed for both Tuesday and Thursday. We now meet in LaTourette Hall rom 227.