

Physics 762 Plasma Physics II: Topics in Nonlinear Plasma Theory
Spring 2018

Times: TuTh 2pm-3:15pm (Phys 4222)

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Office hours: by random access, appointment or e-mail

Web site: www.terpconnect.umd.edu/~drake/classes/physics762

References: No one text will be followed. The following are useful references and have been placed on reserve in the library:

- Davidson Methods in Nonlinear Plasma Theory
- Sagdeev/Galeev Nonlinear Plasma Theory
- Biskamp Nonlinear Magnetohydrodynamics
- Biskamp Magnetic Reconnection
- Melrose Instabilities in space and laboratory plasmas

Topics: The dynamics of plasmas are often controlled by nonlinear behavior. This course will introduce some of the basic techniques which have been developed to understand and describe these dynamics with applications in space and laboratory plasmas. Topics include nonlinear waves and shocks, wave-particle interactions, quasilinear theory and maps, wave-wave interactions, parametric instabilities, drift-waves and transport, Navier Stokes and MHD turbulence, cascade processes and intermittency, magnetic reconnection and the dynamo.

Grading: Homework assignments will be made and collected. There will be no formal final exam.