

PHYS 761 COURSE OUTLINE

Total =
26 lectures

I. Introduction

- ① A. The plasma state - basic parameters *
- ② B. Ionization processes (brief) *
- ③ C. Thermal equilibrium (brief) *

II. Vlasov Theory

- ④ A. Heuristic derivation *
- ⑤ B. Properties of solutions *
- ⑥ C. Relation to fluid equations
- ⑦ D. Derivation from Liouville Equation (strip) *
- ⑧ E. Linear electrostatic plasma waves
- ⑨ F. Landau damping
- ⑩ G. Two stream and "bump on tail" instability
- ⑪ H. Particle trapping
-coherent sources of radiation

III. Strong Magnetic Fields

- ⑫ A. Particle Orbits
-magnetic confinement fusion — tokamak
- ⑬ -magnetospheres — dipole
- ⑭ B. EM waves in magnetized plasma
- ⑮ 1. Linear
- ⑯ 2. Nonlinear - parametric decay
- ⑰ C. Magneto-Hydrodynamics
- ⑱ 1. Low frequency waves
- ⑲ 2. Plasma confinement
- ⑳ 3. Plasma currents and self-generated magnetic fields
-dynamo
-reconnection

IV. Collisions

- 22 A. Basic collisional scattering
- 23 B. Transport coefficients

VI. Non-neutral plasmas

- 25 A. Charged particle beams
- 26 B. Cold plasma traps

8 lectures

+12

10

8 lectr

8-lectures