

ASTRONOMY 825

Radiative Gas Dynamics

Winter Quarter 2009
Tu Th 11:10 - 12:30
4054 McPherson Lab

Professor: Barbara Ryden
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Textbook: *Radiative Gas Dynamics*, by Barbara Ryden, a set of lecture notes that will be handed out in class.

Grading policy: Problem sets will be assigned on alternate Thursdays (starting Thursday, January 15), and will be due exactly one week later, at class time. The problem sets will count for 2/3 of your total grade.

The final exam will be a take-home exam, and will be handed out during finals week. The final exam will count for 1/3 of your total grade.

Course objectives: This course will provide students with a general overview of gas dynamical processes of interest to astrophysicists. Emphasis will be placed on processes occurring in the interstellar medium of our own galaxy, with additional examples taken from the intergalactic medium. Particular topics covered will be plane parallel shocks, MHD shocks, spherical supernova remnants, ionization fronts, spherical accretion, accretion disks, stellar winds, and astrophysical jets.

Students with disabilities: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated; please inform the professor as soon as possible of your particular needs.

Academic misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct wherever committed: illustrated by, but not limited to, cases of plagiarism and cheating on examinations. Instructors shall report all instances of alleged misconduct to the committee (Faculty Rule 3335-5-497). For additional information, see the Code of Student Conduct. (Collaboration with other students on problem sets is explicitly permitted – but during the final exam, you'll be on your own.)

TENTATIVE COURSE SCHEDULE

Chapter 1: Fundamentals of Gas Dynamics (Jan 6, 8)

Chapter 2: Viscosity and Heat Conduction (Jan 13)

Chapter 3: Sound and Shocks (Jan 15, 20)

Chapter 4: Radiative and MHD Shocks (Jan 22)

Chapter 5: Spherical Blastwaves and Supernova Remnants (Jan 27)

Chapter 6: Ionization Fronts and HII Regions (Jan 29, Feb 3)

Chapter 7: Basic Turbulence (Feb 5)

Chapter 8: Spherical Accretion (Feb 10, 12)

Chapter 9: Accretion Disks for Beginners (Feb 17, 19)

Chapter 10: Advanced Accretion Disks (Feb 24)

Chapter 11: Solar Wind (Feb 26, Mar 3)

Chapter 12: Winds From Hot and Cool Stars (Mar 5, 10)

Chapter 13: Astrophysical Jets (Mar 12)