

## AY 216 - Interstellar Medium Syllabus

### PART I DIFFUSE ISM

- 1/18 Lec 1 Discovery and history of the ISM
- 1/22 Lec 2 Radiation transfer & interstellar absorption lines
  
- 1/29 Lec 3 Photoionization of hydrogen; HII regions
- 1/31 Lec 4 Thermal properties of HII regions; forbidden lines
  
- 2/5 Lec 5 Optical properties of interstellar dust
- 2/7 Lec 6 Composition & thermal properties of dust
  
- 2/12 Catchup session and discussion of problems
- 2/14 Lec 7 Observed phases and physical processes
  
- 2/19 Lec 8 Ionized Phases
- 2/21 Lec 9 Cosmic rays and magnetic fields
  
- 2/26 Lec 10 Tracing HI
- 2/28 Lec 11 Neutral phases and theory of phases
  
- 3/04 Lec 12 Summary of the diffuse ISM

### PART II DENSE ISM

- 3/06 Lec 13 Molecular spectroscopy
  
- 3/11 Lec 14 H<sub>2</sub> and CO
- 3/13 Lec 15 Introduction to chemical activity
  
- 3/18 Lec 16 Molecular ions & fractionation
- 3/20 Lec 17 Catchup: Supernovae - JRG

-----SPRING BREAK-----

- 4/01 Lec 18 Photon Dominated Regions
- 4/03 Lec 19 CO observations of molecular clouds

4/08 Lec 20 Physical properties of molecular clouds  
4/10 Lec 21 Distribution of the molecular gas  
  
4/15 Lec 22 Stability of molecular clouds  
4/17 Lec 23 Magnetic fields and core stability and collapse  
  
4/22 Lec 24 Low-Mass young stellar objects  
4/24 Lec 25 From cores to disks

### PART III IGM

4/29 Lec 26 Quasar absorption lines  
5/01 Lec 27 Intergalactic medium  
  
5/06 Lec 27 The first atoms, molecules and stars and  
5/08 Lec 28 Review

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5/13-15 Final oral exams

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### Standard Texts

L Spitzer, Jr., "Physical Processes in the Interstellar Medium"  
(Wiley 1978)  
AGGM Tielens, "Physics and Chemistry of the Interstellar Medium"  
(Cambridge, 2005)  
D Osterbrock & G. Ferland, "Astrophysics of Gaseous Nebulae and  
Active Galactic Nuclei" (2nd Edition, University Science 2005)  
MA Dopita & RS Sutherland, "Astrophysics of the Diffuse  
Universe" (Springer 2002)

### Basic Books

FH Shu, "The Physics of Astrophysics" (2 volumes, University  
Science, 1991, 1992)  
GB Rybicki & AP Lightman, "Radiative Processes in  
Astrophysics" (Wiley, 1979)

