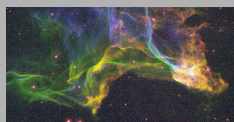


Astro 320: Astrophysics of the Interstellar Medium



Spring 2015



This course will explore the physics and structure of the interstellar medium from observational and theoretical viewpoints. Dust, diffuse, molecular, and ionized gas components, heating and cooling, shocks, star formation, and hydrodynamics will be considered.

Professor: Dr. Debra Elmegreen

office: Sanders Physics 101.01, x7356; e-mail elmegreen@vassar.edu

hours: MW 1-2 or by appt. any day; feel free to drop by or call or email

Text: My class notes, which will be posted on moodle in pdf format chapter by chapter

plus "The Physics and Chemistry of the Interstellar Medium," A.G.G.M Tielens (Cambridge: Cambridge University Press)

Recommended texts (in my office; ask to borrow) include

"Physics of the Galaxy and Interstellar Matter," Scheffler & Elsasser, 1987

"Physical Processes in the Interstellar Medium," L. Spitzer, 1977

"Interstellar Processes," ed. H. Thronson, 1987

"Galactic Astronomy," Mihalas & Binney 1981

"The Galactic Interstellar Medium," Burton, B. Elmegreen & Genzel, 1992

"Galaxies & Galactic Structure," D. Elmegreen, 1998 (esp. ch. 6)

Final Grade: based on

homework	40%
PowerPoint presentation	5%
3 tests	30%
comprehensive take-home final	25%

*Note: late homework will be downgraded 5 pts for every day late; homework questions will not be answered before class on the day they're due. Class attendance is expected; **email me if absent.***

Assignments, lecture summaries, powerpoints, documents, and review materials will be available via moodle.vassar.edu using your Vassar login information.

SYLLABUS

Week	Date	Subject	class notes	Tielens
1-2	Jan. 28-Feb. 6	overview, Poisson's law Dust: distribution, radiative transfer, interstellar reddening, grain formation, polarization	I, II.1-II.7	Chs. 1, 5
3-4	Feb. 9-20	Atomic gas: star counts, dust/gas ratio, diffuse clouds and superclouds, 21 cm emission and absorption, column densities	II.8-III.8	Chs. 6, 8, 13 (skim)
5-6	Feb. 23-Mar. 6	heating and cooling functions, local thermodynamic equilibrium	III.9- 11	Chs. 2, 3
7	Mar. 9-13	Molecular gas: cloud distribution and chemistry, formation, heating and cooling, reflection nebulae	IV	Chs. 4, 10
	Mar. 16-27	spring break		
8-9	Mar. 30-Apr. 10	Ionized gas: H II regions, evolving Stromgren spheres, chemistry, spectral lines, opacities, heating and cooling	V	Chs. 7, 9
10-11	Apr. 13-24	Hydrodynamics: star formation, protostars, infrared sources, masers, propagation, winds, SNR's, galactic dynamics, shocks, coronal gas	VI.1-10	Ch. 11
12-13	Apr. 27-May 11	Jeans and Parker instabilities, energy dissipation, cloud-cloud collisions, spiral density wave dispersion relations; cosmological IGM	VI. 11-15, VII	Ch. 12

Academic accommodations are available for students with disabilities who are registered with the Office of Disability and Support Services. Please schedule an appointment with me early in the semester to discuss any accommodations for this course which have been approved by the Director of Disability and Support Services as indicated in your accommodation letter.