

Supernovae, Neutron Stars and Black Holes

Instructor: Prof. Norbert Bartel, PSE 331, bartel@yorku.ca www.yorku.ca/bartel
Course Number: PHYS 6210 1.0 F
Time/Location: W 16:00 to 17:00 ?

Textbooks: *Astrophysics*, J. Irwin, Wiley, 2007
Theory of Stellar Structure and Evolution, 2nd edition, D. Prialnik, Cambridge University Press, 2009
Pulsar Astronomy, fourth edition, A. Lyne, F. Graham-Smith, Cambridge University Press, 2012
Introduction to High-Energy Astrophysics, S. Rosswog, M. Brueggen, Cambridge University Press, 2007
Supernovae and Gamma-Ray Bursters, K. Weiler, *Lecture Notes in Physics*, Springer, 2003

Course Contents: 1. Supernovae
1.1 Classification and characteristics of supernovae
1.2 Explosion process
1.3 Shock front interaction with the circumstellar medium
1.4 Supernovae as distance indicators
2. Neutron stars
2.1 Structure and magnetosphere of neutron stars
2.2 Neutron star mass-radius relation for equations of state
2.3 Characteristics of pulsars
2.4 Pulsar emission mechanisms
2.5 Pulsars as clocks for tests of general relativity
2.6 Magnetars
2.7 Gamma-ray bursts
3. Black holes
3.1 Observational evidence for the existence of black holes
3.2 The event horizon

Evaluation: In-class quizzes: 15% of final mark
Homework: 35% of final mark
Project: 50% of final mark

Office hours: P331, MW 14:00-14:45