

Physics 130 General Relativity Seminar

Assignment 6 February 24, 2011

Part 1: Readings

Cheng: Chapters 7(Spherically Symmetric Spacetime - GR Tests)

Amanda Peet GR Lectures - Appropriate pages.

Other sources among references on website or books in my office.

Part 2: Review Questions from Text

You must do the readings BEFORE attempting the problems in order to get a good grasp of the overall content of the week's material to be understood. A problem should then make you look more carefully at specific parts of the readings that are necessary for the solution of that particular problem!

Suggested answers in textbook.

Will be discussed first in seminar.

Participation in discussion = 10% Seminar grade.

Any other questions about readings.

1. Cheng: Think about all of review questions.

Part 3: Everyone Problems

Everyone must understand these solutions.

Most solved in back of textbook.

Only look at solutions if completely stumped!

Will be discussed second in seminar.

Random choice of presenter.

Quality/correctness of presentation = 40% Seminar grade.

1. Cheng: 7-2 Gravitational redshift via energy conservation
2. Cheng: 7-3 Light deflection via the geodesic equation
3. Cheng: 7-5 Total energy in curved spacetime
4. Cheng: 7-7 Four-velocity of a particle in circular orbit

Part 4: Extra Problems

One seminar member has overall responsibility for each problem.

Solve as many as you can.

Attempting zero beyond your responsibility is NOT an option!

You will not understand solutions without attempting a problem.

Volunteer presenters OK. Never volunteering is NOT an option!

1. EP #09 Killing Vectors in Flat Space _____
2. EP #28 Isometries and Killing Vectors _____
3. EP #37 Velocity of Light _____
4. EP #38 Orbiting Photons _____
5. EP #39 Light cones _____
6. EP #40 Circular Orbit _____
7. EP #41 Space Garbage _____
8. EP #42 Astronauts in Orbit _____
9. EP #43 Weak Gravity _____