

Physics 262: Practice Exam 2
100 points

1. (30 points) Two spaceships approach earth from opposite directions at $0.8c$. They each are measured to be 100 m long in the earth's reference frame. How long are the ships in the one of the ship's reference frames?
2. (30 points) In a four slit interference setup, where each slit is a distance d from it's neighbor, find the angle of the first minimum.
3. (20 points) Explain the 'Pole in Barn' paradox using a Minkowski diagram.
4. (10 points) If it desired to have a coating on glass that is anti-reflective at 500 nm, but not at 600 nm, should the thinnest film possible be used that produces destructive interference at 500 nm? Explain.
5. (5 points) When using x-ray diffraction to learn about a material's crystal structure, why are x-ray's used and not visible light?
6. (5 points) State the principle of relativity.