ASTRO 1020 Lab

L9: Black Holes

Grading

- All labs are scaled to be graded out of **10 points***

Points per question	Description
1.0	A correct answer with units and work shown. Answers that don't require work will be graded on completion
0.8	A correct answer without units or work shown
0.6	An incorrect answer with units and work shown
0.4	An incorrect answer without units or work shown
0.2	Some work shown without an answer
0.0	Not Attempted

Lab Schedule

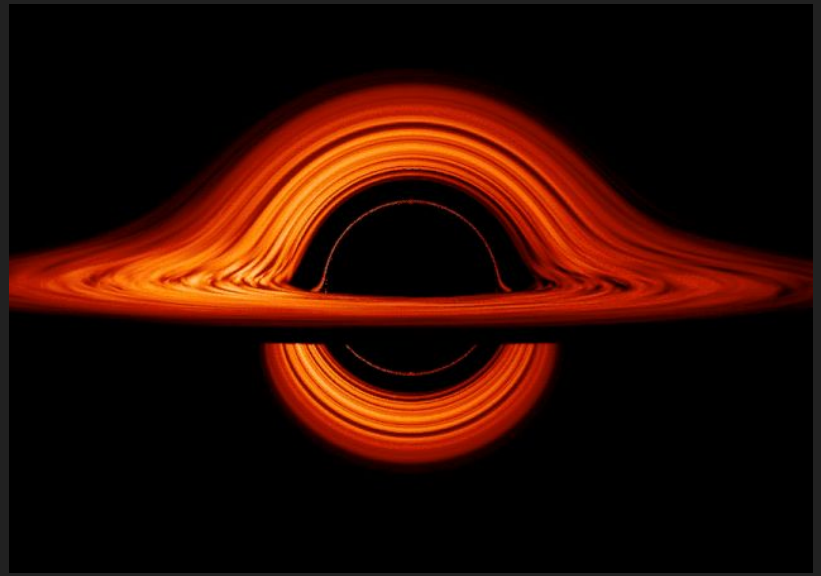
Lab	Dates	Topic
~~LAB 1~~	~~Sept 9 – 13~~	~~Sun~~
~~LAB 2~~	~~Sept 16 – 20~~	~~Spectra~~
~~LAB 3~~	~~Sept 23 – 27~~	~~Binary Stars~~
~~LAB 4~~	~~Sept 30 – Oct 4~~	~~Period Luminosity~~
~~LAB 5~~	~~Oct 7 – 11~~	~~Hubble's Law~~
~~LAB 6~~	~~Oct 14 – 18~~	~~Galaxy Classification~~
~~LAB 7~~	~~Oct 21 – 25~~	~~Tully Fisher Relation~~
~~LAB 8~~	~~Oct 28 – Nov 1~~	~~Star Clusters & Supernovae~~
LAB 9	Nov 4 – 8	Black Holes
Semester Project	Nov 18 – 22	

Things you need to know for Lab 9

- Basics of black holes
- Schwarzschild radius
- Volume of a sphere
- Density
- Brief introduction to relativity

Basics of black holes

- Concentrated, hyperdense regions of space
- Nothing, not even light, escapes the event horizon
- Can be surrounded by disk
- Result of death of massive star
- Contains a central singularity



Schwarzschild radius

- The radius of the black hole (singularity to event horizon)
- Also the size you need to shrink something to make it a black hole

$$R_S = \frac{2GM}{c^2}$$

Volume of a sphere

$$V = \frac{4}{3}\pi R^3$$

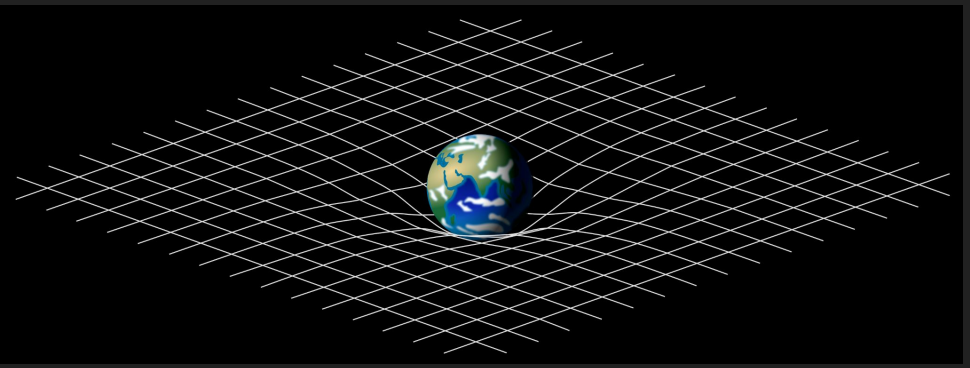
Density

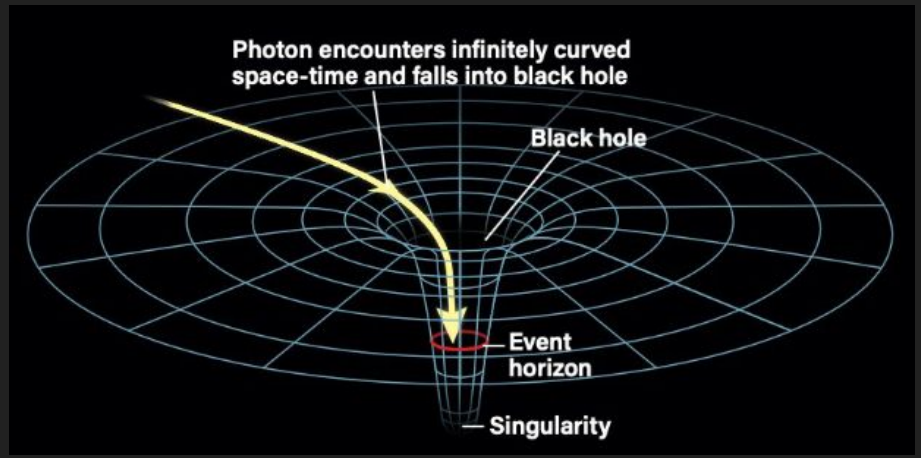
- A measure of how much mass can fit in a given volume

$$D = \frac{M}{V}$$

Brief introduction to relativity

- Theory famously developed by Einstein
- Describes gravity as bending the fabric of space-time





Questions?