10/20/04

Last chance for book: Coop will return

News?

Burt Rutan (SpaceShip1) 10am Friday, October 29, in the LBJ Auditorium. www.me.utexas.edu/rutan

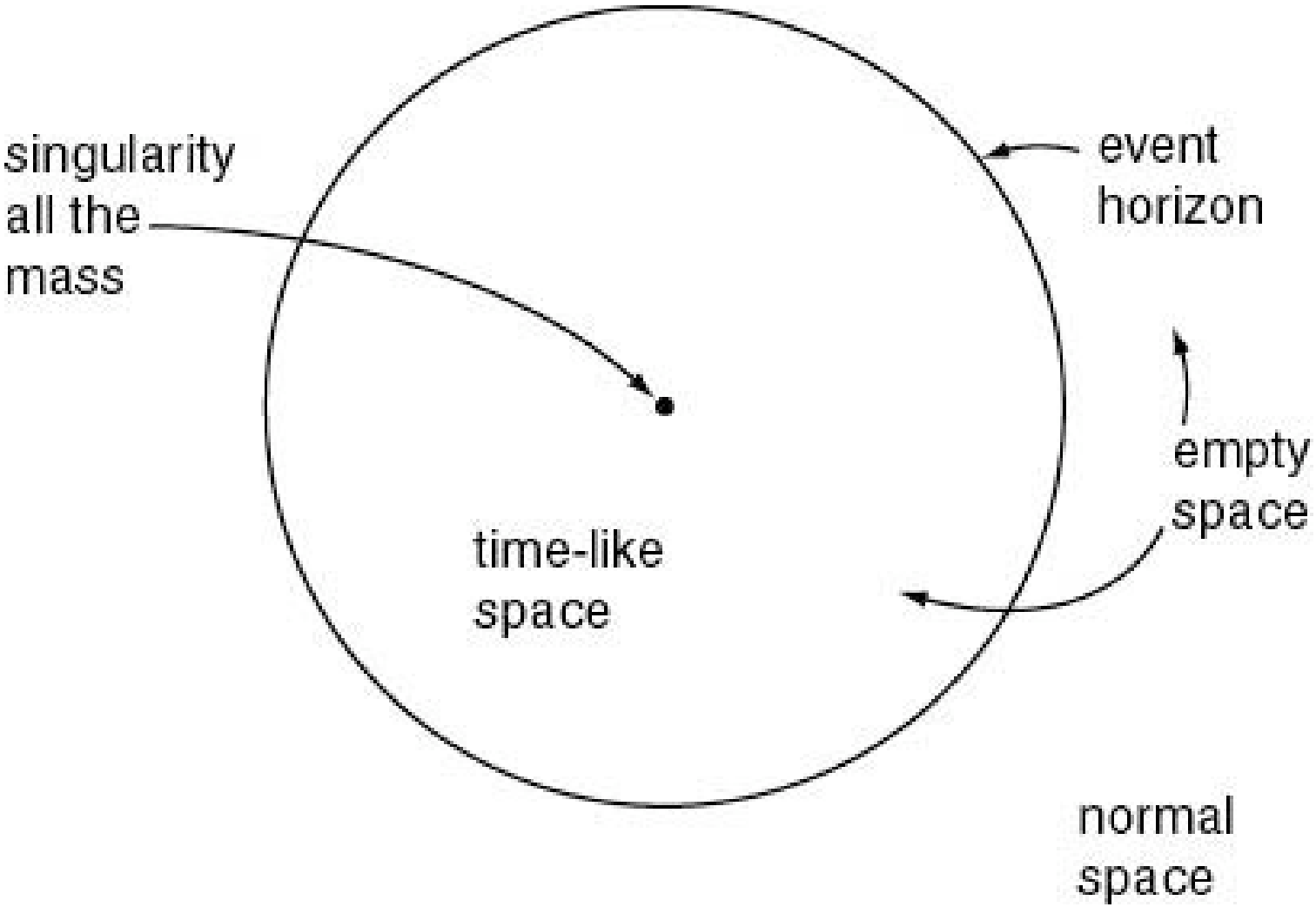
Eclipse blunder!

Total eclipse of the Moon Wednesday, Oct 27 starting 8pm CDT.
Wednesday night public viewing is at the 16-inch telescope on the top of RLM: http://outreach.as.utexas.edu/public/viewing.html
This can be part of extra credit observational project

Pic of the day

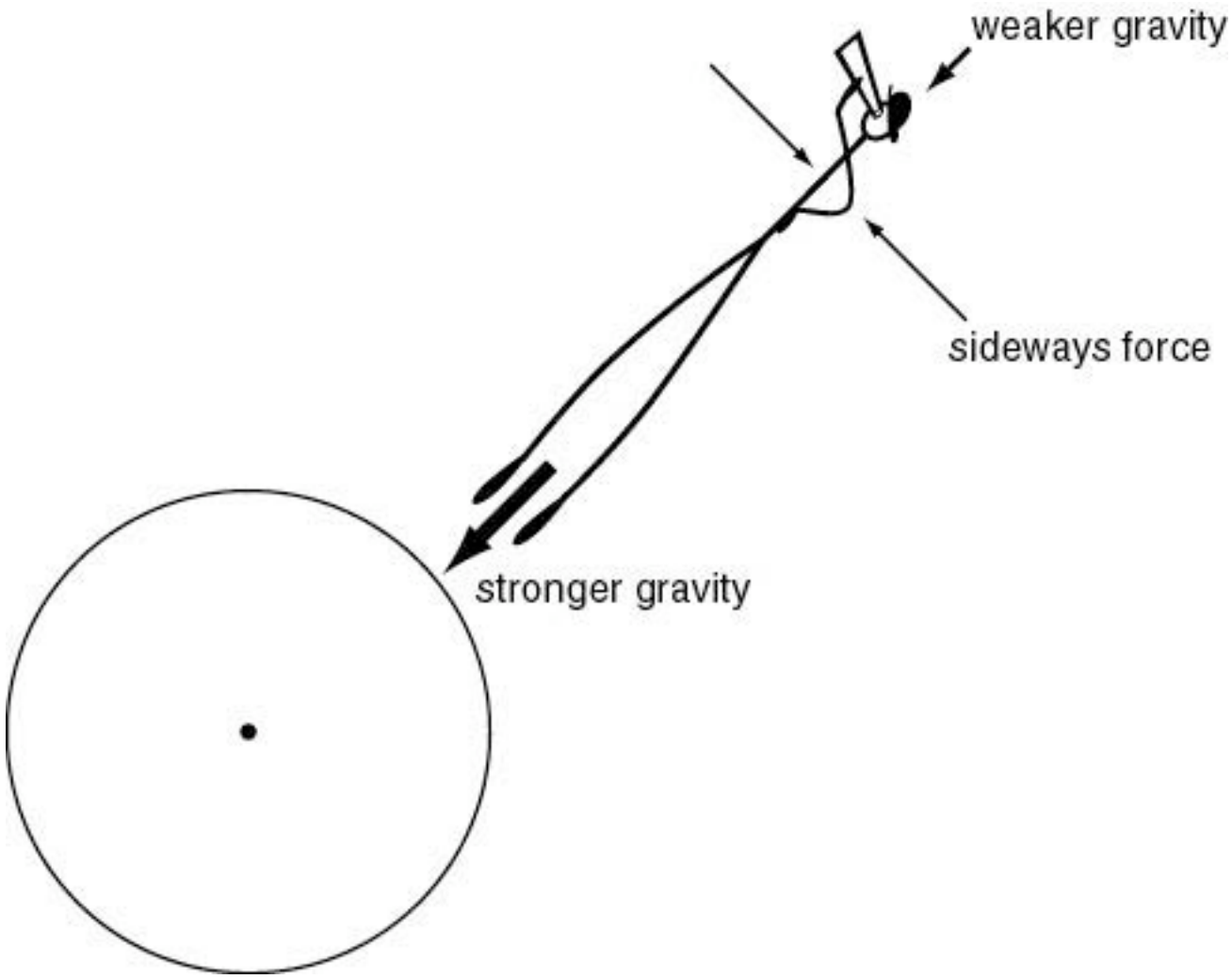
Star formation

Figure 9.1



Basic properties of (non-rotating) black hole

Figure 9.2



Tidal Forces

Embedding diagram - 2 D "shadow" of 3 D curved space, preserves basic aspects of geometry, whether curved or not, and, if curved, how.

Meaning of ***flat space*** in 3 (or higher) dimensions

If 3 D space is flat $C=2\pi r$; sum of angles of triangle $=180°$; parallel beams of light never cross ***in 3D***.

The embedding diagram of 3D flat space is a flat 2D plane

In curved 3D space, the flat space answers will be wrong: 2D embedding diagram will help to illustrate that.

Real 3 D curved space (for us!!) might curve in a 4 D "hyperspace"

Can determine curvature, shape of 3 D real space by doing 3 D geometry

Don't need to ask about 4 D (but will!)

Invert balloon - 2 D embedding diagram of curved 3 D space around gravitating object

Properties of this curved space that are preserved in the embedding diagram:

$C < 2\pi r$

Sum of angles of triangle not equal 180^o (can be > or <)

Parallel lines diverge or cross

Orbit - circle around “cone”

Moon is going as straight as it can in curved space around the Earth

This is how gravity works for Einstein - no Newtonian Force -

Gravitating objects curve the space around them - nearby objects move in that curved space

The straight lines of their force-free motion are warped by the curved space.

3 D space is not a “cone;” that is just a property of the 2 D embedding diagram, but real 3 D space has the property $C < 2\pi R$

Δ not equal 180^{o} // lines cross, light is deflected