#### 3/28/08

Wheeler on travel next week (meeting on deflagration to detonation transitions in Type Ia supernovae), film on Einstein's Universe, Monday, Wednesday.

No office hours today

Astronomy in the News - shuttle landed safely

Pic of the day - naked eye gamma-ray burst GRB080319b, in X-rays (left) and UV (right).



# Rotating Kerr Black Hole

Mass and spin, but no electrical charge

Assume all mass in singularity, no mass anywhere else (assumption necessary to solve equations)

Find *singularity is a ring* (not a point)



0 thickness,  $\infty$  density, still uncertainty problem

Infinite Universes!

### Cross-sectional view of rotating Kerr black hole



### In future



Are Different Universes Real?

In Real Universe:

Light falls in

Accelerated to higher energy: Bluesheet warp space change mathematical, hence physical solution

So, probably not in this case, but stay tuned...

## One Minute Exam

In a rotating black hole:

- A) The surface of infinite redshift is identical to the event horizon.
- B) You can escape the black hole back to the universe from which you entered.
- C) There are exactly two universes.
- D) The space entered through the singularity is different than the space surrounding the singularity.

# Chapter 10 - Finding Black Holes for Real

There may be 1 - 100 million black holes in the Galaxy made by collapsing stars over the history of the Galaxy. How do we find them?

Black holes made from stars are really black! (Negligible Hawking radiation).

Those alone in space not impossible to find, but very tough.

Look for binary systems, where mass accretion occurs.

Will not see the black hole, cannot yet "see" a black spot.

Can detect *halo of X-rays* from orbiting matter, the accretion disk, near the event horizon that will reveal the presence and nature of the black hole. *Look in accreting binary systems!* 

