Astronomy 596/496 APA

Lecture 9

Oct. 20, 2016

Announcements:

- *No HW was due today. Sad!*

Today's Agenda

★ Order of Magnitude

★ Colloquium Preview

Order of Magnitude: Milky Way Black Holes

0. Guess the number N_{bh} of black holes in our Galaxy

1. Think of at least *two ways* to estimate N_{bh}
    based on known/knowable inputs

2. Estimate the distance d to the nearest black hole

3. Bonus: Is there more mass in Sgr A* or the other black holes?

Order of Magnitude: Near-Earth Supernovae

A supernova explosion becomes dangerous at distance $d \leq d_{\text{kill}} \approx$ 8pc

Q: guess why–what's the nature of the biohazard?

1. Come up with an expression estimating the rate $\lambda(d)$ of supernovae at distance $\leq d$

2. Estimate the typical timescale for supernovae inside d_{kill}
   To what should this timescale be compared? What do we learn?

3. Bonus: Radioactive ^{60}Fe on the Earth and Moon tell us that a supernova exploded 2–3 Myr ago at $d \sim 20 - 100$ pc
   Is this a surprise?

Colloquium Preview

Next week, Oct. 25
• Jennifer van Saders, Carnegie Observatories
"Tuning the Clock: Making Sense of Stellar Rotation Observed with *Kepler*"

Q: What is Kepler?

Q: How can it measure stellar rotation?

Q: Why do stars rotate at all?

Q: How does the Sun's rotation period compare to other main sequence stars–higher and lower mass?

Q: How could stellar rotation be used to probe stellar age?
fun term of art: *gyrochronology*

Q: Why is it useful to know stellar ages?