

Physics 121 – November 4, 2009

This Week:

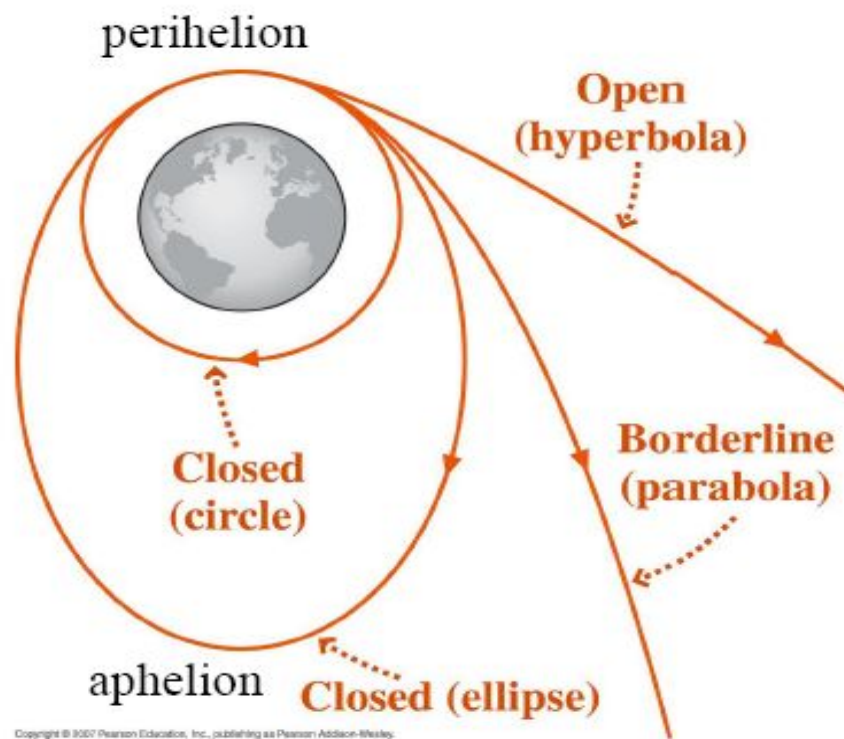
- Homework problems due **Friday, Nov 6**
Chap 8, # 13, 19, 20, 25, 29, 49
- Study for Exam 2: topics in **Chapters 6,7,9,10,11**
- No MP Assignment – instead, study for exam on **Monday, Nov 9**. Practice problems will be posted online Nov 7-8.

Revised office hours, this week only:

Wednesday (today) 12:30-2 pm

Friday 10:30-12:00

Different kinds of orbits are characterized by different velocities at perihelion



Note that projectile motion is only approximately parabolic (really a section of an ellipse).

This section approximates a parabola.



Focus is Earth's center.

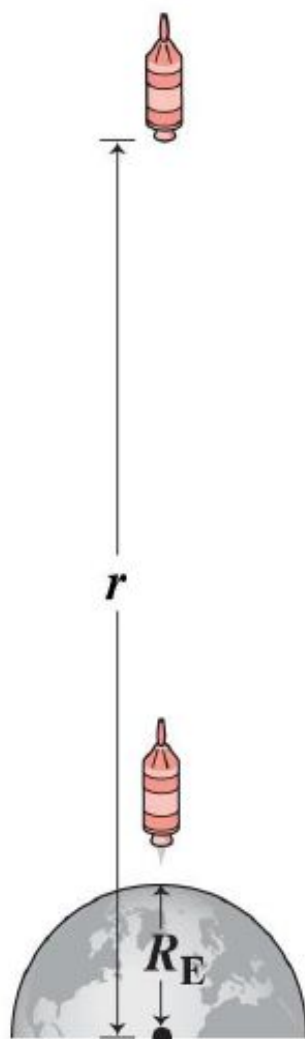
Now, gravitational potential energy:

$$U(r) = - Gm_1m_2/r$$

Note:

- 1/r dependence
- minus sign!

(Example 8.5) Consider a rocket launched vertically upward with initial velocity v . How high does it go?



Final state:

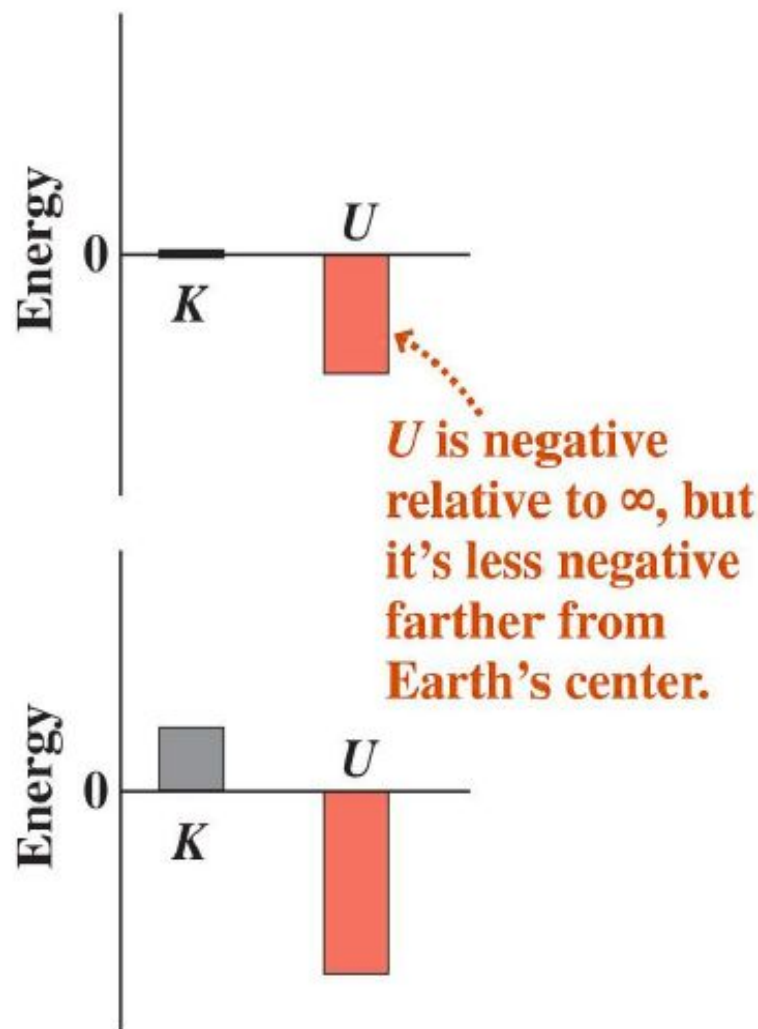
$$K = 0$$

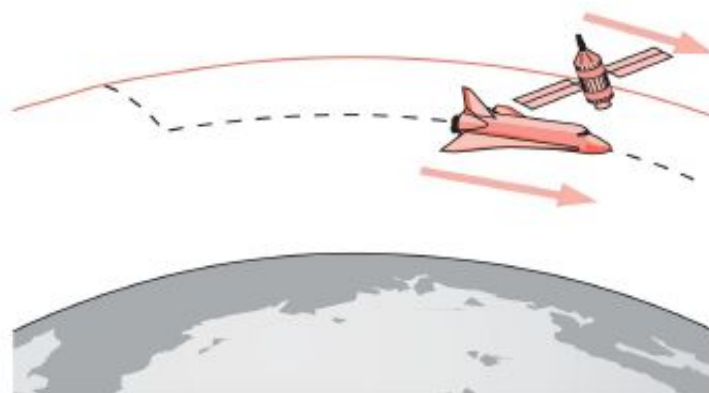
$$U = - \frac{GM_E m}{r}$$

Initial state:

$$K_0 = \frac{1}{2}mv^2$$

$$U_0 = - \frac{GM_E m}{R_E}$$





Clicker question:

A communication satellite and the space shuttle are both in circular orbits about the Earth, but the shuttle orbits at a lower altitude. Which of the following statements is true?

- A. the satellite has a higher speed and a greater total energy.
- B. the shuttle has a higher speed and a greater total energy.
- C. the shuttle has a higher speed and a smaller total energy.
- D. the speeds are equal but the satellite has a greater total energy.