CENTRIPETAL FORCE FROM GRAVITY

Unit 15 & 8

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Astronomers' Dark Energy Hopes Fade to Gray

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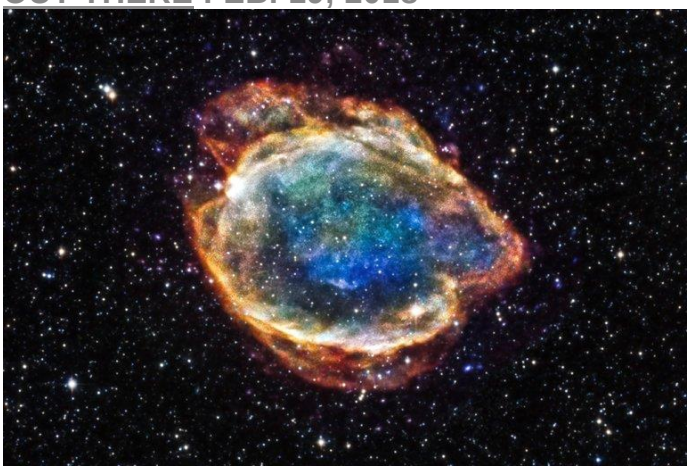

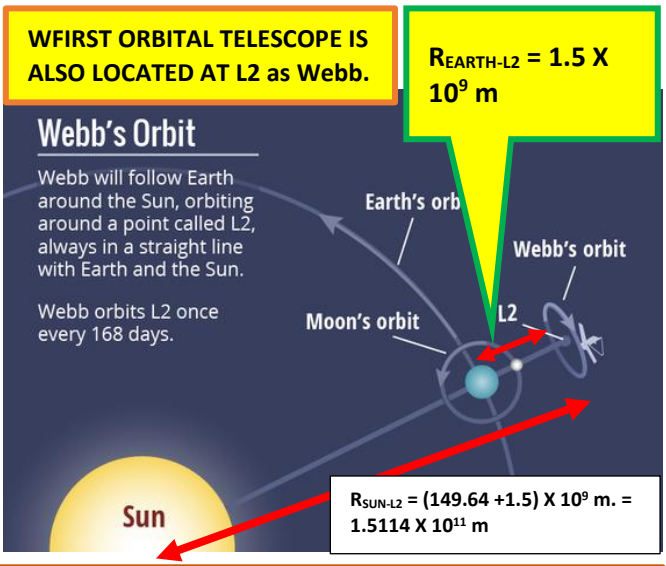

INTRODUCTION: Purpose of this application is to show NEEDED centripetal force(to orbit the sun at same period as earth at L2 position in space…see graphic at right) is PROVIDED by sufficient gravitational force of the sun and earth moon system.

QUESTIONS: (a) Find number of seconds (T =?)in a year? (b)) Find $F_{CENTRIPETAL}$ NEEDED to keep Wfirst telescope(m = 2200 kg.) in orbit at L2?, (c) Find gravitational force on Wfirst telescope satellite due to sun?, (d) Find gravitational force on Wfirst due earth/moon system?, (e) Find total gravitational force due to sun & earth/moon system combined?, (f) How do (d) & (e) compare?

HINTS: $F_{CENTRIPETAL\ NEEDED} = m v^2/R$, $v = R\omega = 2\pi R/T$, T = period, $F_{GRAVITY} = G\ m\ M/R^2$, $G = 6.67 \times 10^{-11}$ N kg.^{2}/m.^{2}, $m_{EARTH} = 6.07 \times 10^{24}$ kg., $M_{SUN} = 1.989 \times 10^{30}$ kg. , more hints in upper graphic at right.

ANSWERS: (a) T = 3.154×10^7 s., (b) F = ~13.2 N, (c) ~ 12.71 N, (d) ~ 0.4 N, (e) $F_{DUE\ TO\ GRAVITY}$ = ~ 13.11 N , (f) close!
COMMENT: Europeans have the PLANK satellite telescope at L2 also.

A remnant from a Type 1A supernova observed in the Milky Way, one of the cosmic markers of how fast the universe is expanding. Observing exploding stars helped astronomers first discover the existence of dark energy nearly 20 years ago.

A star-crossed mission nearly 20 years in the making that was intended to seek an answer to the most burning, baffling question in astronomy — and perhaps elucidate the fate of the universe — is in danger of being canceled.

The **Wide-Field Infrared Survey Telescope, or Wfirst,** (**(((at L2)))**…see graphic above…..about same location as Jack Webb proposed telescope)was being designed to investigate the mysterious force dubbed dark energy that is speeding up the expansion of the universe and search out planets around other stars.

In 2010, a blue-ribbon panel from the National Academy of Sciences charged with charting the future of space-based astronomy gave the mission the highest priority for the next decade. Under the plan, it could have launched in mid-2020s with a price tag of $3.2 billion. But it was zeroed out in the NASA budget proposed by President Trump last week.

In a statement accompanying the budget, Robert M. Lightfoot Jr., the agency's acting administrator, called the deletion "one hard decision," citing the need to divert resources to "other agency priorities." NASA is shifting its focus back to the moon.Nobody is under any illusion that a president's budget proposal is the last word on anything. Congress, which usually listens to the academy's recommendations, will have the last word in a dance that many NASA missions, including the Hubble Space Telescope, have participated in. As the old saying among space scientists at the Jet Propulsion Laboratory, home of many missions, goes: **"It's not a real mission until it is canceled."**. It drew comparisons to the cancellation of the Superconducting Supercollider that ended American supremacy in particle physics. Astronomers have hungered for a space mission to investigate dark energy ever since 1998, when observations of the exploding stars known as supernovae indicated that the expansion of the universe was speeding up, the distant galaxies were shooting away faster and faster from us as cosmic time went on. It is as if, when you dropped your car keys, they shot up to the ceiling.