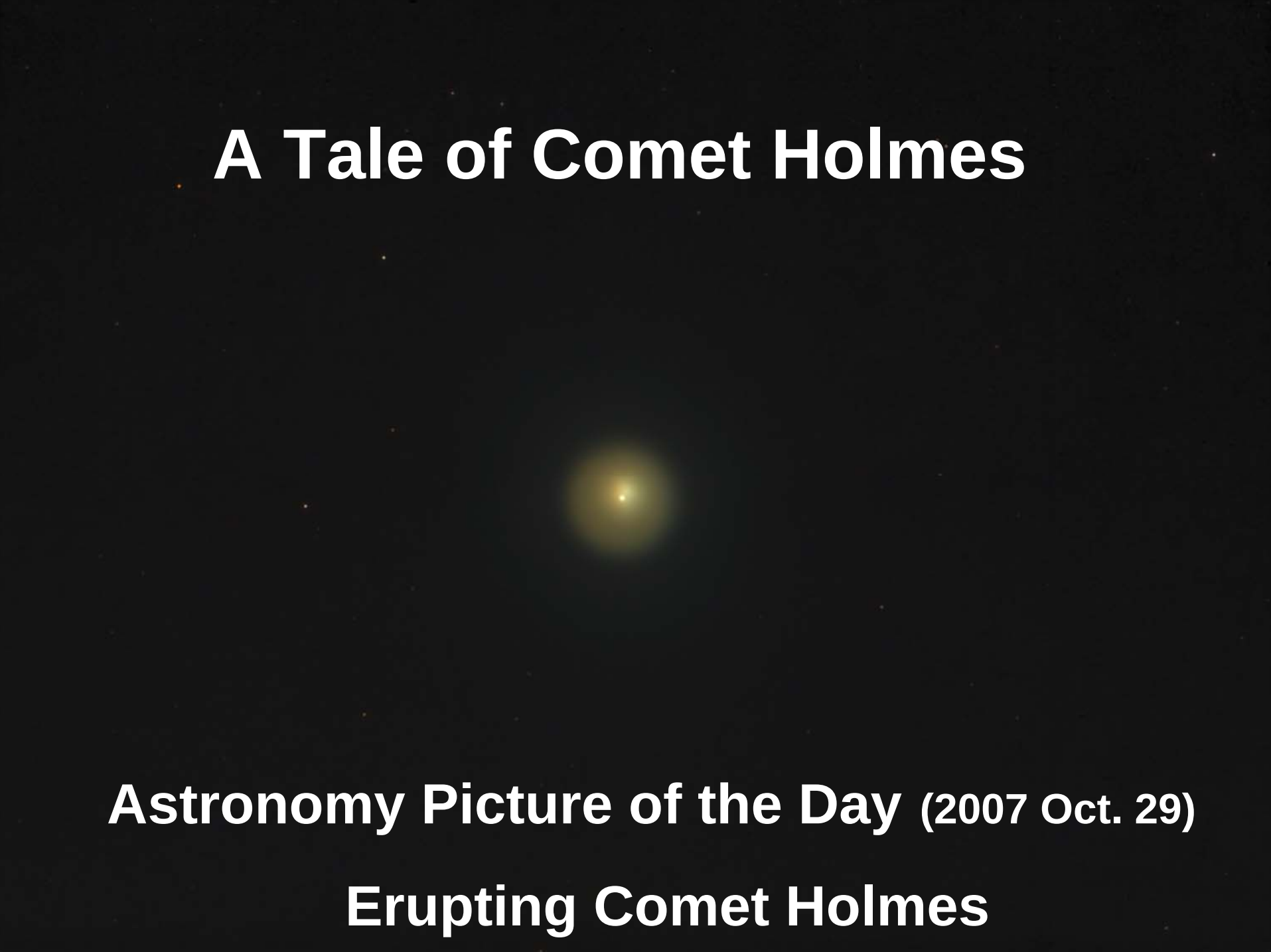
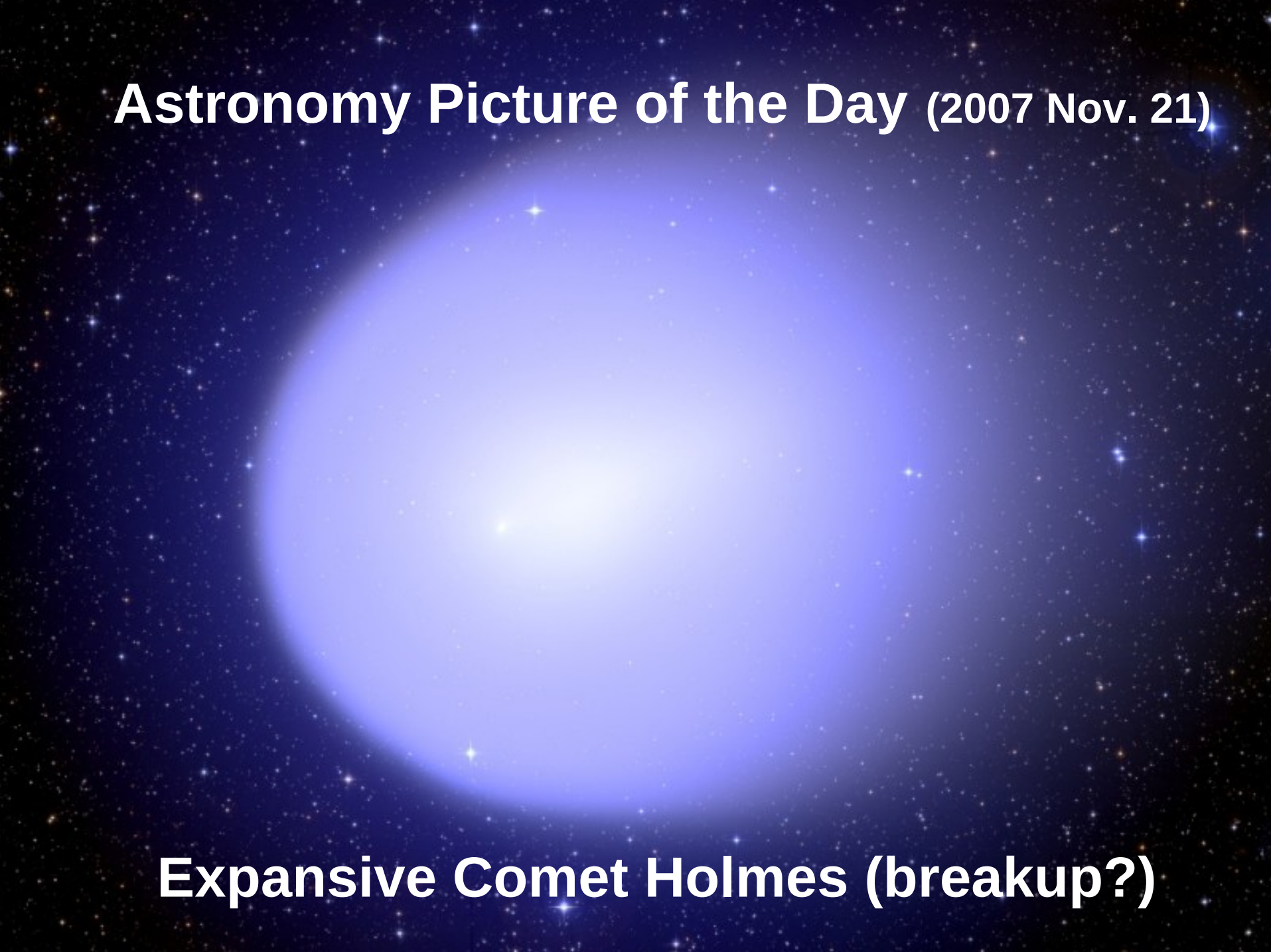
A Tale of Comet Holmes



Astronomy Picture of the Day (2007 Oct. 29)

Erupting Comet Holmes

Astronomy Picture of the Day (2007 Nov. 21)



Expansive Comet Holmes (breakup?)

Credit: Ishak Benbabaste

Advanced Question
Chap. 14, Q7 in P372

Explain the statement “Methane” is to Uranus’s atmosphere as water is to Earth’s atmosphere?

Advanced Question
Chap. 14, Q7 in P372

Answer:

Methane makes up cloud in Uranus's atmosphere, and water makes up cloud in Earth's atmosphere

In the atmsophere, water could be gas and solid at the temperature of the Earth, while methane could be gas and solid at the temperature of the Uranus.

Advanced Question
Chap. 14, Q43 in P373

The New Horizons spacecraft will swing by Jupiter to get a boost from that planet's gravity, enabling it to reach Pluto relatively quickly. To see what would happen if this technique were not used, consider a spacecraft trajectory that is an elliptical orbit around the Sun. The perihelion of this orbit is at 1 AU from the Sun (at the Earth) and the aphelian is at 30 AU (at Pluto's position). Calculate how long it would take a spacecraft in this orbit to make the one-way trip from Earth to Pluto. Based on the information in section 14-10, how much time is saved by making a swling by Jupiter instead?

Advanced Question
Chap. 14, Q43 in P373

Answer:

If in the elliptical orbit with perihelion of 1 AU and aphelion of 30 AU,

semimajor axis a = (30+1)/2=15.5 AU

Using Kepler's law $P^2=a^3$

$$P=(a)^{3/2}=(15.5)^{3/2}= 61 \text{ years.}$$

The travel time is half of this, ir 30.5 years.

Using Jovian planet's grvity assit, New Horizon travel time is about 9 years.

More than 21 years will be saved !!!