Asteroids, Comets, and Meteoroids

Chapter 28 Section 4 pg 739-744
ASTEROIDS

• A small, rocky object that orbits the sun
• Most are located in a band between the orbits of Mars and Jupiter (Asteroid Belt)
• Classified by their composition
  – CARBON asteroids – dark in color
  – SILICATES asteroids – look like Earth rocks
  – IRON & NICKEL asteroids – rarest, shiny, metallic
COMETS

• A small body of rock, ice, and cosmic dust that follows an elliptical orbit around the sun and that gives off gas and dust in the form of a tail as it passes close to the sun.

Halley's Comet as photographed May 8, 1910, by Dr. G.W. Ritchey using the 60-inch (1.5-meter) telescope at Mount Wilson Observatory, Calif., during the comet's last appearance. The head of the comet and the beginning of its long tail are shown. Short, straight streaks are background stars. CREDIT: NASA/JPL
COMET COMPOSITION

• The HEAD
  – The CORE (nucleus)
    • Made of rock, metals, and ice
    • 1 km – 100 km in diameter
  – The COMA
    • Spherical cloud of gas and dust surrounding the nucleus
    • A comet’s bright appearance is the result of sunlight reflecting off the coma

• The TAIL
  – Result when the sun causes the comet’s ice to change to gas
  – Solar wind pushes the gas away from the head of the comet so its tail always points away from the sun.
The OORT CLOUD

- A spherical region that surrounds the solar system
- Contains billions of comets
- LONG-PERIOD COMETS: a comet that takes more than 200 years to complete one orbit around the sun
The KUIPER BELT

- A region of the solar system that starts just beyond the orbit of Neptune
- SHORT-PERIOD COMETS: comets that take less than 200 years to complete one orbit around the sun
- Because Pluto is in this region during most of its orbit, it was changed to a dwarf-planet
METEOROIDS

• A relatively small, rocky body that travels through space
• Diameters less than 1 mm
• Most are debris from comets
• Larger ones (> 1 cm) are results of collisions between asteroids
METEORS

• A bright streak of light that results when a meteoroid burns up in Earth’s atmosphere
• Most commonly referred to as a “Shooting Star”
• Meteor showers occur when a large number of small meteoroids enter Earth’s atmosphere in a short period of time
  – These showers occur at the same time each year
<table>
<thead>
<tr>
<th>Name</th>
<th>Date of Peak</th>
<th>Moon</th>
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<tbody>
<tr>
<td>Quadrantids</td>
<td>Night of January 2</td>
<td>Sets shortly before dawn</td>
</tr>
<tr>
<td>Lyrids</td>
<td>Night of April 21</td>
<td>In view most of the night</td>
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<tr>
<td>Eta Aquarids</td>
<td>Nights of May 4/5</td>
<td>Early morning crescent</td>
</tr>
<tr>
<td>Perseids</td>
<td>Nights of August 11/12</td>
<td>Sets after midnight</td>
</tr>
<tr>
<td>Orionids</td>
<td>Night of October 21</td>
<td>In view most of the night</td>
</tr>
<tr>
<td>Leonids</td>
<td>Night of November 16</td>
<td>Full</td>
</tr>
<tr>
<td>Geminids</td>
<td>Nights of December 12, 13</td>
<td>In view most of the night</td>
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</tbody>
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METEORITES

• A meteoroid that hits Earth
• Three Types
  – Stony: similar to Earth rocks; carbon
  – Iron: distinctive metallic appearance
  – Stony-Iron: rare; contains iron and stone