

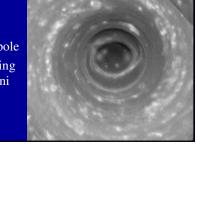
Agenda

- Announce:
 - Read Ch. 9
 - Part 2 of Projects due Thursday
 - No office hours tomorrow
 - Planetary Tutorial
 - Need dates of extra credit presentations
- Review Planet Formation
- "Welcome to Mars"

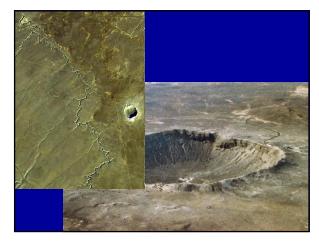


Saturn's Hurricane

- First eyewall/hurricane observed on another planet
- Storm stays at Saturn's south pole
- Yet more stunning info from Cassini









Earth's Moon

- Moon rocks show composition w/r/t oxygen isotope same as Earth's mantle
- Nickel-iron core not that big, consistent w/ formation from Earth's mantle
- Scarcity of volatile/lighter elements consistent with being formed w/ lots of heat

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- 2. Explanations of exceptions seem ad hoc...even a wrong theory can be "fixed up"
- 3. Exosolar planets aren't where they're supposed to be according to theory

Why do we think the inner (terrestrial) planets became more dense than the outer planets?

- In the collapsing solar nebula, denser materials sank toward the center
- The sun's gravity pulled denser materials toward the center
- The inner nebula was so hot that only metals and rocks were
- able to condenseThe rotating disk in which the planets formed spun lighter elements outward by centrifugal force

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- A less hydrogen and helium, more heavier elements

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- Hydrogen compounds (water, methane, ammonia) where the nebula was cold (<150 K)
- Rocky material where the nebula was 500–1500 K (depending on the type of rock)
- Metal where the temperature was 1000–1500 K
- All except #1

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Why could the Jovian planets grow to be much larger than the terrestrial planets?

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- They formed beyond the *frost line* where ices can condense so they included hydrogen compounds
- They were far enough from the Sun to escape the *heavy bombardment* that battered the early solar system

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- Similar to winds on earth but faster and stronger
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Could a solar system like ours have formed with the first generation of stars after the Big Bang?

- Possibly there is no physical reason why not.
- No, there would not have been enough time to form planets.
 No, the expansion of the Universe would have torn the solar system apart.
- No, there would not have been enough metals and rock to form terrestrial planets.
- 5. No, the stars would have died by now.

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- form terrestrial planets.

What age would radiometric dating give for a chunk of recently solidified lava from Kilauea, an active volcano in Hawaii?

- 1. Zero.
- 2. The half life of potassium-40 (1.25 billion years).
- 3. The half-life of Uranium-238 (4.5 billion years).
- 4. The age of the solar system.
- 5. The age of the volcano.

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What age does radiometric dating give for moon rocks and meteorites?

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- 2. About 6,000 years
- 3. About 4 million years
- 4. About 4 billion years
- 5. Around 14 billion years

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