

## ASTR 1020: Stars & Galaxies

April 28, 2008

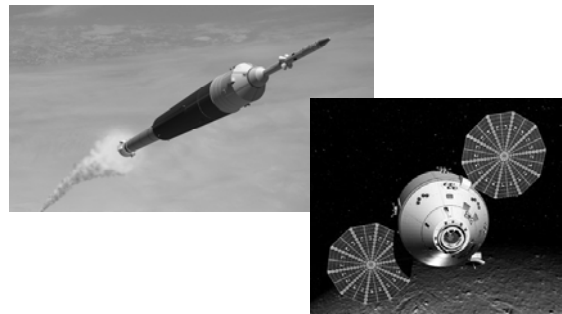
- Reading: Chapter 13 – Extrasolar Planets.
- *MasteringAstronomy* Homework on The Fate of the Universe is due April 30<sup>th</sup>.
- **Final Exam:** May 5, 4:30 – 7:00 pm;  
Chapters: 1.1-1.2, 4.1-4.4, 5, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23.



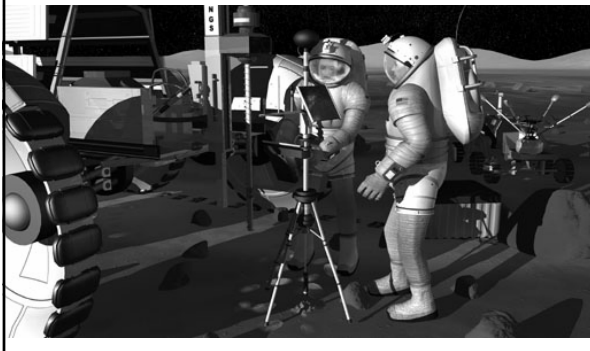
## Back to the Moon and Back to Stay



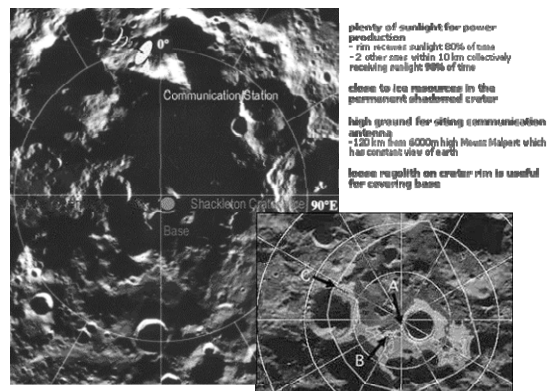
## The New Rockets (Ares I & V) and the New Spacecraft (Orion)

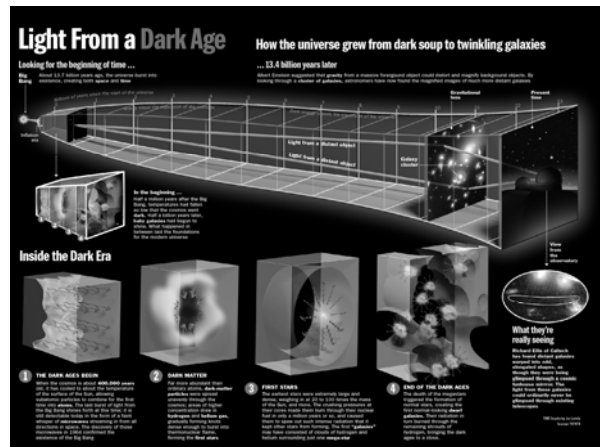
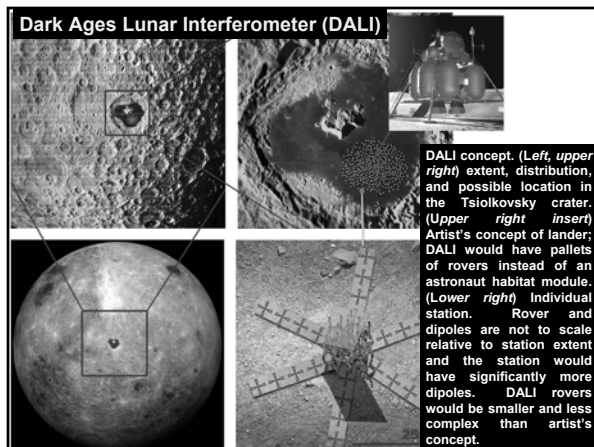
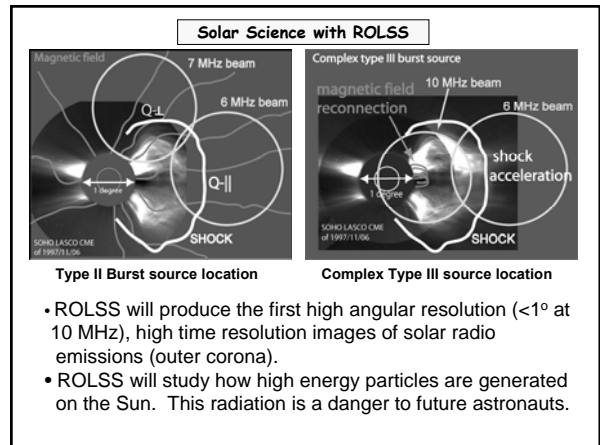
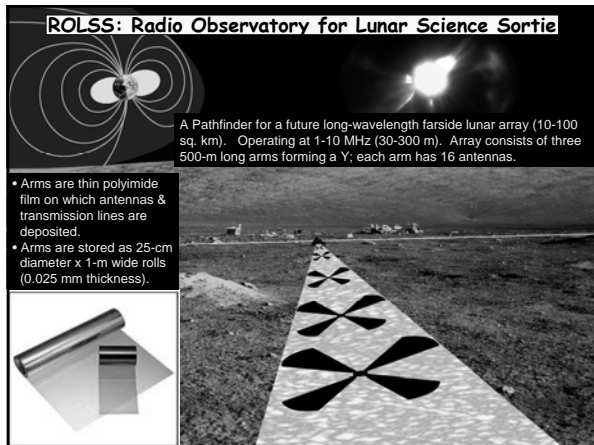
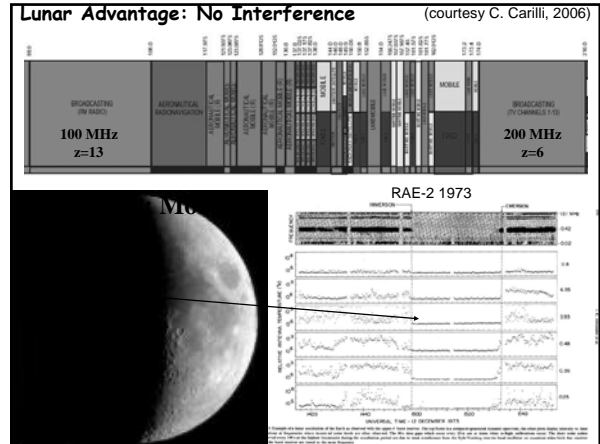
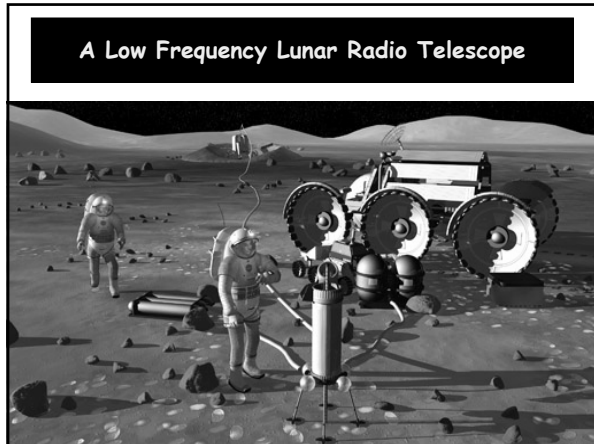


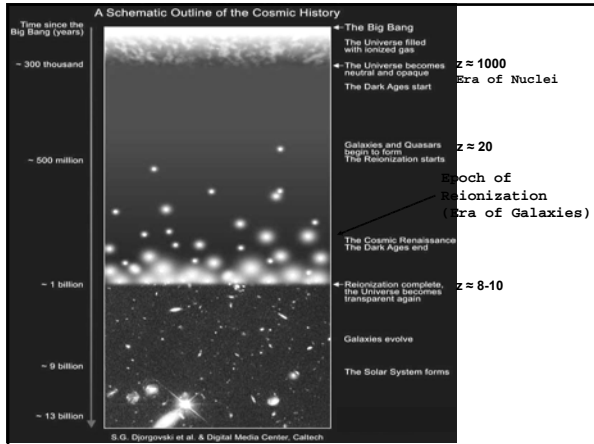
## Exploring the Moon



## Possible Site for a Lunar Base - Shackleton Crater





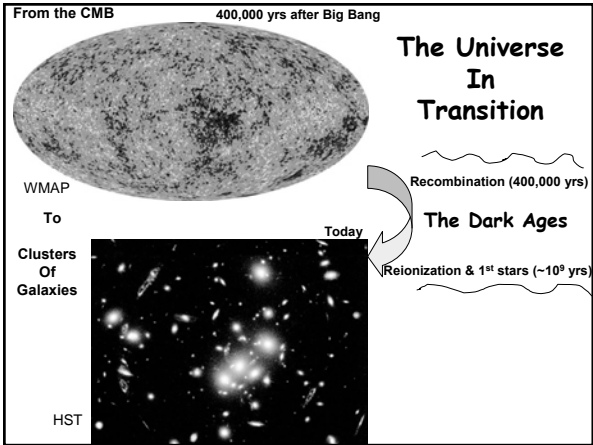


**Clicker Question: Which of the following is the correct order of the eras in the history of the universe?**

- Nucleosynthesis, GUT, Atoms, Reionization
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### NEWSFOCUS

#### Asking for the Moon

Thanks to seven upcoming robotic missions, lunar science is poised for its biggest boost in a generation. The NASA managers have made it clear that research will be the focus of the exploration.

**THE FUTURE:** NASA's Artemis program aims to return humans to the moon by 2025. This will be followed by a permanent lunar base. The Artemis program is a multi-step process that includes sending a lunar lander, a lunar orbiter, and a lunar surface station. The lander will carry a crew of two astronauts and a rover. The orbiter will provide communication and navigation services. The surface station will be a small, temporary structure that will serve as a base for the crew. The station will be built using lunar resources, such as regolith and water. The station will be used for a variety of scientific and commercial activities. The Artemis program is a major step towards human exploration of the moon and beyond.

### LUNAR SCIENCE

#### WINNERS

Low-frequency radio astronomy, interaction with Earth's magnetotail, surface electromagnetic fields, radiation, risks, dust hazards, volatiles at poles

#### LOSERS

Distributed seismic networks, optical telescope, sample diversity, gravitational waves, astrobioology, galactic cosmic rays

the solar wind, and a low-frequency radio observatory on the far side, in the quiet zone protected from noisy Earth. "This is the most exciting experiment which could be done from the surface of the moon," says Mario Livio, an astrophysicist at the Space Telescope Science Institute in Baltimore, Maryland.

**Science, 16 March 2007**