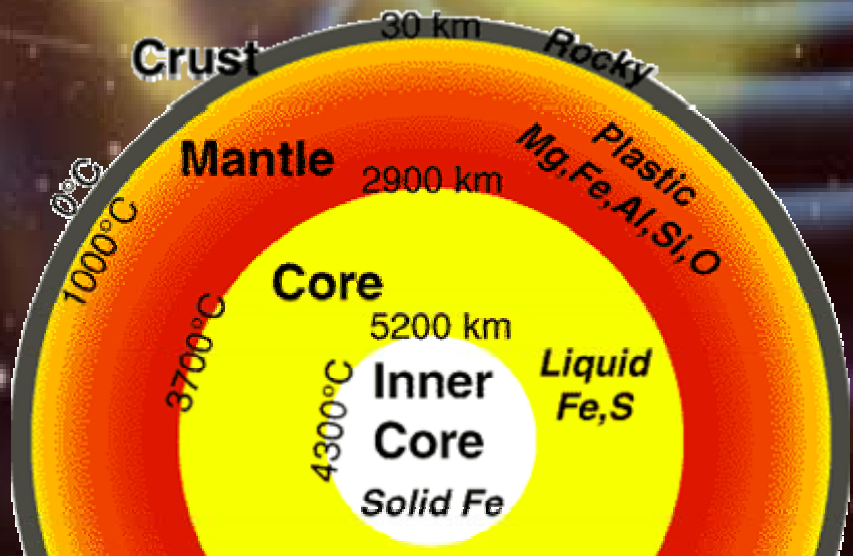
What caused the earth’s magnetic field?

What does the magnetosphere do?

What is a solar storm?

What is an aurora?

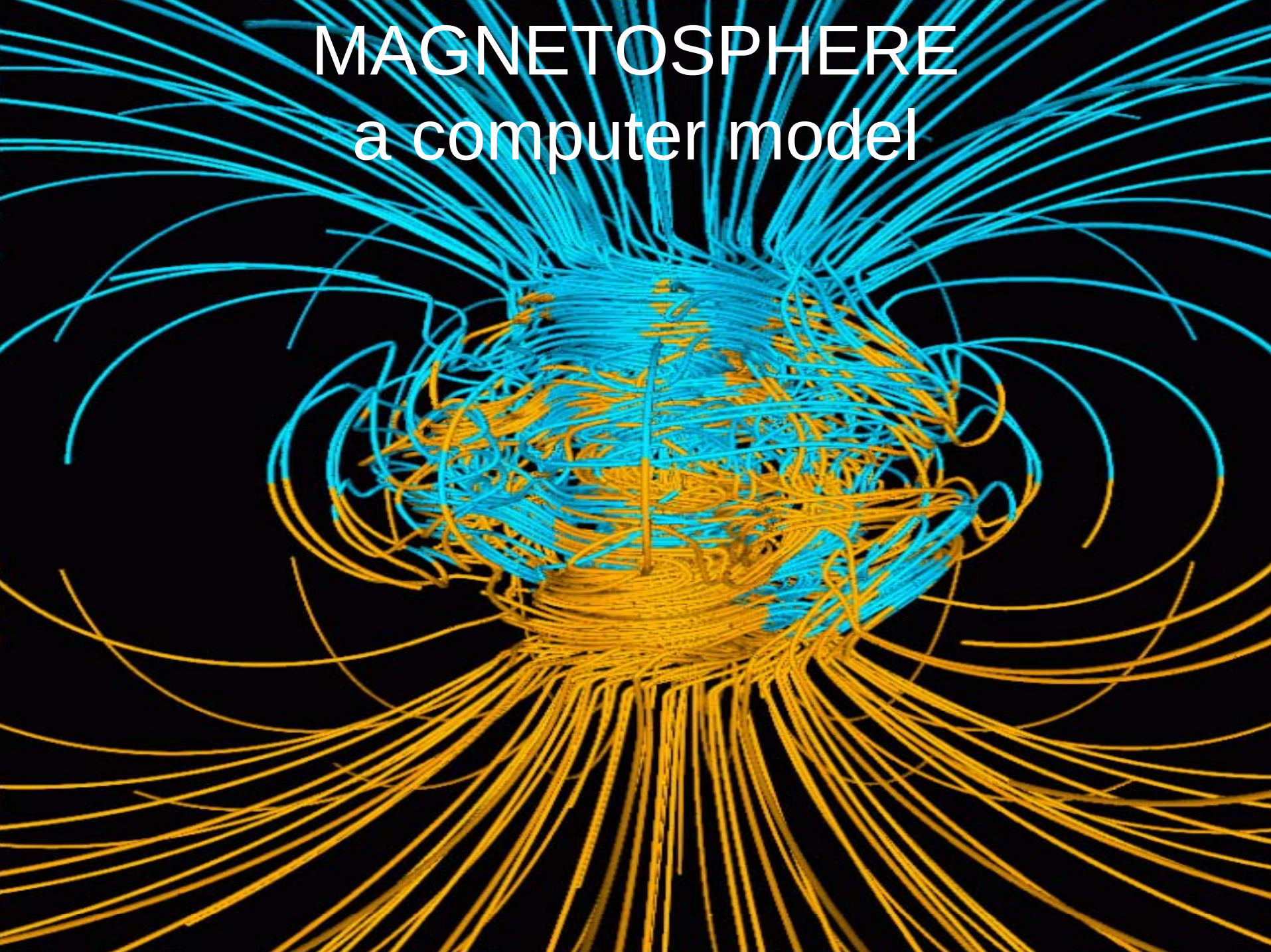
What causes the Earth's magnetic field?

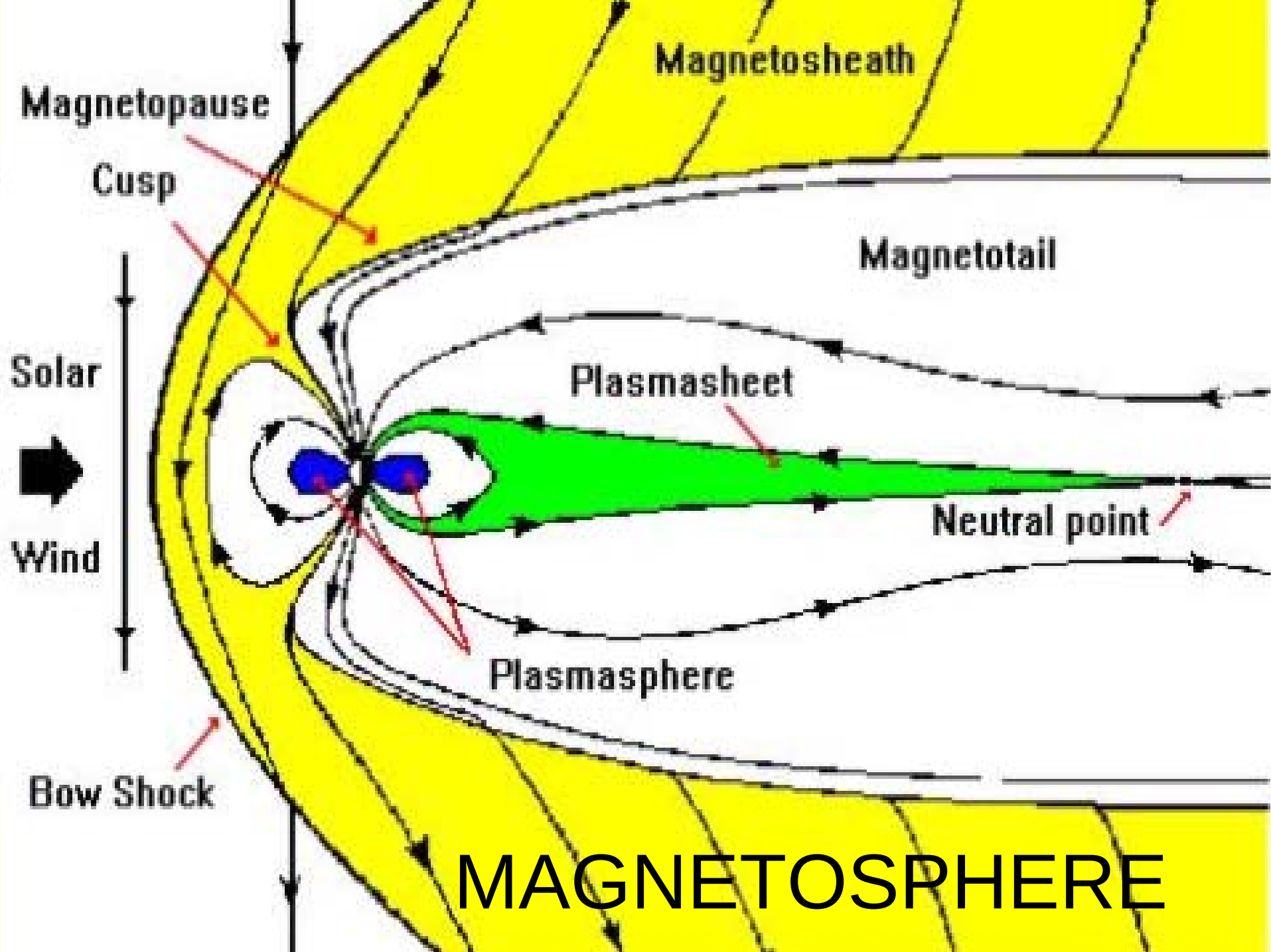


Earth's Core is HOT…REALLY HOT

1. Outer Core is molten Iron
2. Earth rotates on its axis

MAGNETOSPHERE
a computer model

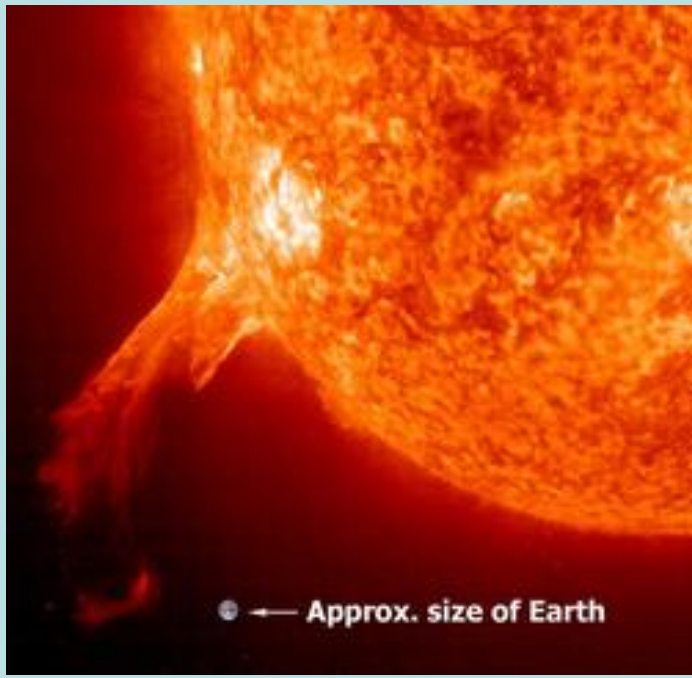




MAGNETOSPHERE

What is a Space Weather?

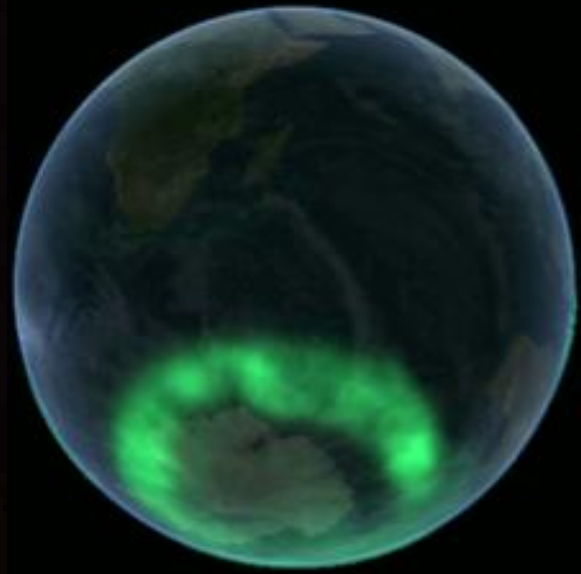
- The Sun creates sunspots, solar flares, coronal mass ejections, coronal holes, and the solar wind.
- Over a solar cycle of about 11 years, radiation and particles such as electrons and protons stream toward Earth with varying intensity and interact with the Earth's magnetic field and atmosphere.



What comes from the sun?

- Electromagnetic Radiation – some good, some bad
  - Light and Heat
  - Sunburn and skin cancer
- Ionized Particles – called Plasma
  - Matter has mass and takes up space
  - Charged particles react with matter in the atmosphere

What is an Aurora?



Northern and Southern Lights

- form when solar particles and magnetic fields pump energy into the Earth's magnetic field

What causes an Aurora?

- The high-speed particles crash into Earth's upper atmosphere (ionosphere) over the polar regions, causing the atmosphere to emit a ghostly, multicolored glow.

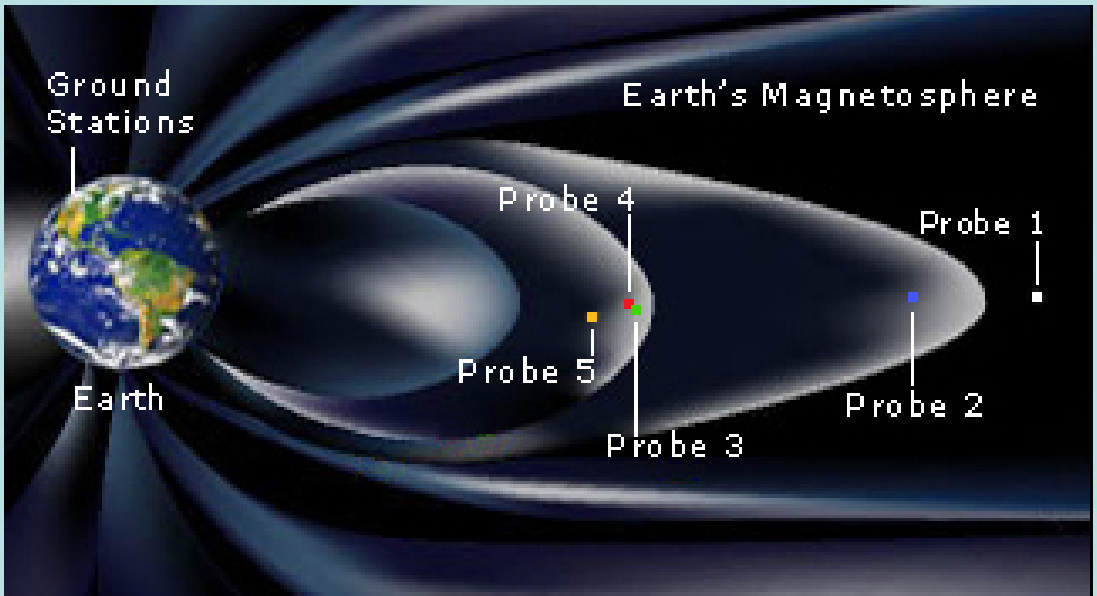
THEMIS

Time History of Events and Macroscale Interactions during Substorms

THEMIS will identify the mechanisms that trigger substorms which cause the Auroras.

(UCB Space Science Laboratory, NASA, Swales Aerospace)

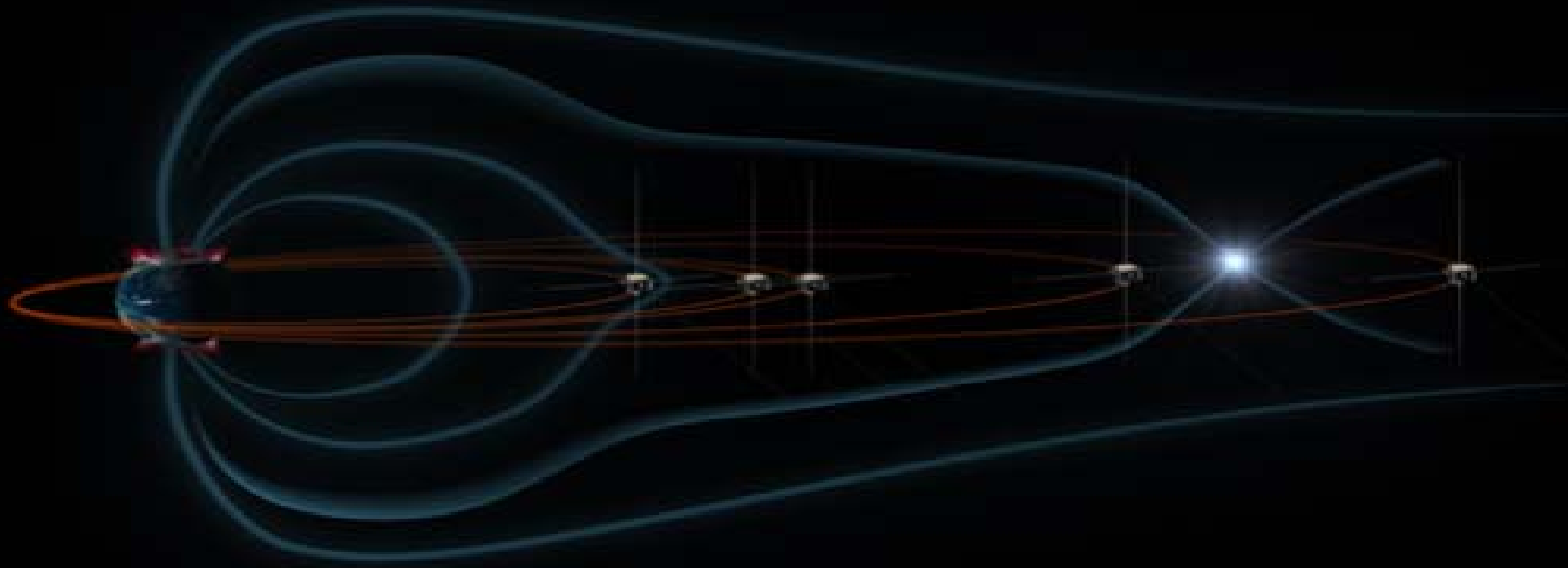
- Launch date February 15, 2007
- Two year mission
- 5 space probes
- 25 scientific instruments
- 20 ground observations



THEMIS MISSION

What sequence of events triggers these auroral eruptions?

- Five identical probes carry electric, magnetic and particle detectors

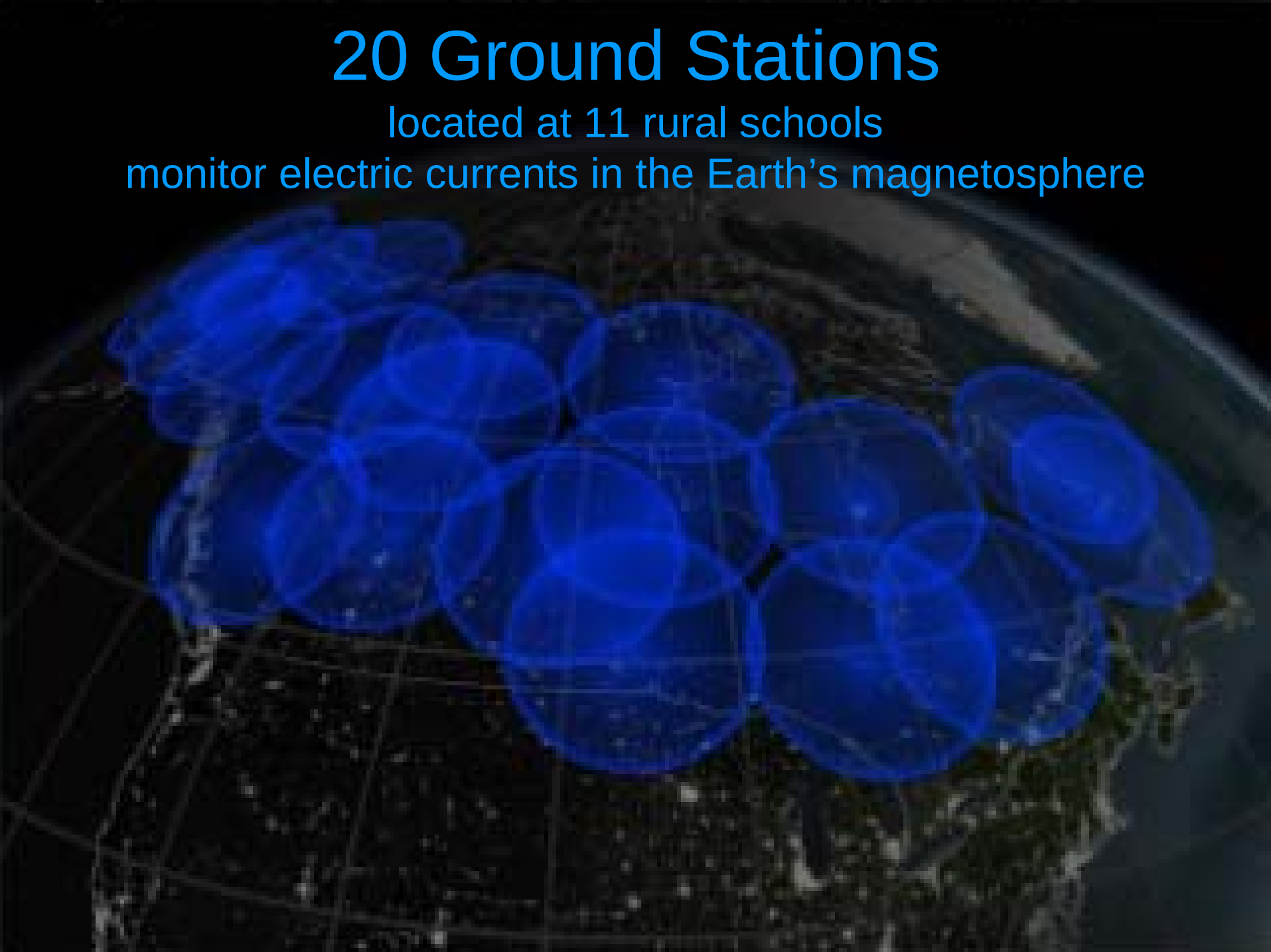


- Probes align every 4 days along the Sun – Earth line to measure magnetic field, electrical flows, plasma waves and energized particles

20 Ground Stations

located at 11 rural schools

monitor electric currents in the Earth’s magnetosphere

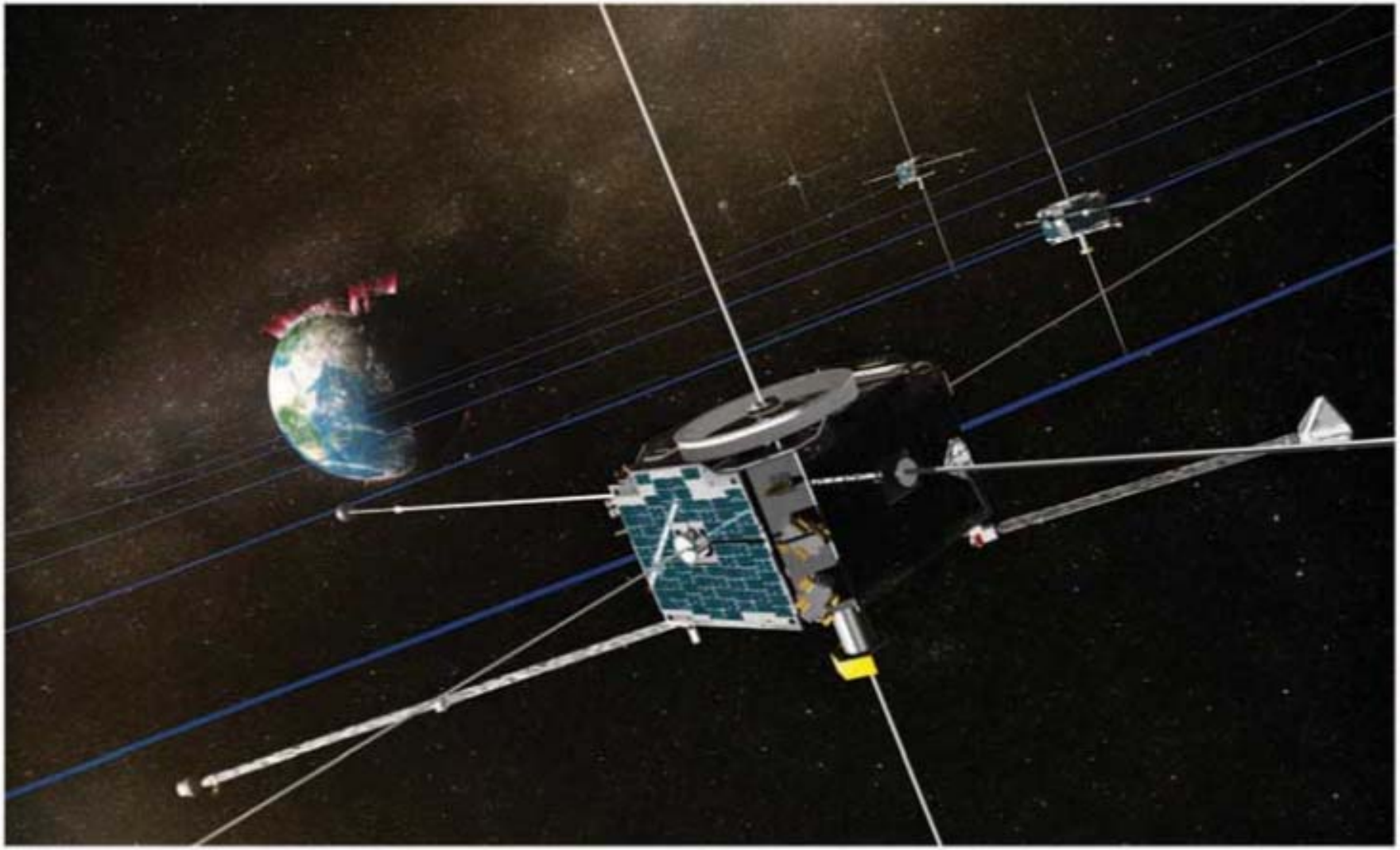


CARSON CITY – WNCC

The blue dots show the location of 10 magnetometers located in rural schools.

The red dots show the location of ground-based observatories which have all-sky cameras and magnetometers.

National Aeronautics and Space Administration



THEMIS—Time History of Events and Macroscale Interactions During Substorms

www.nasa.gov