

# Aurora

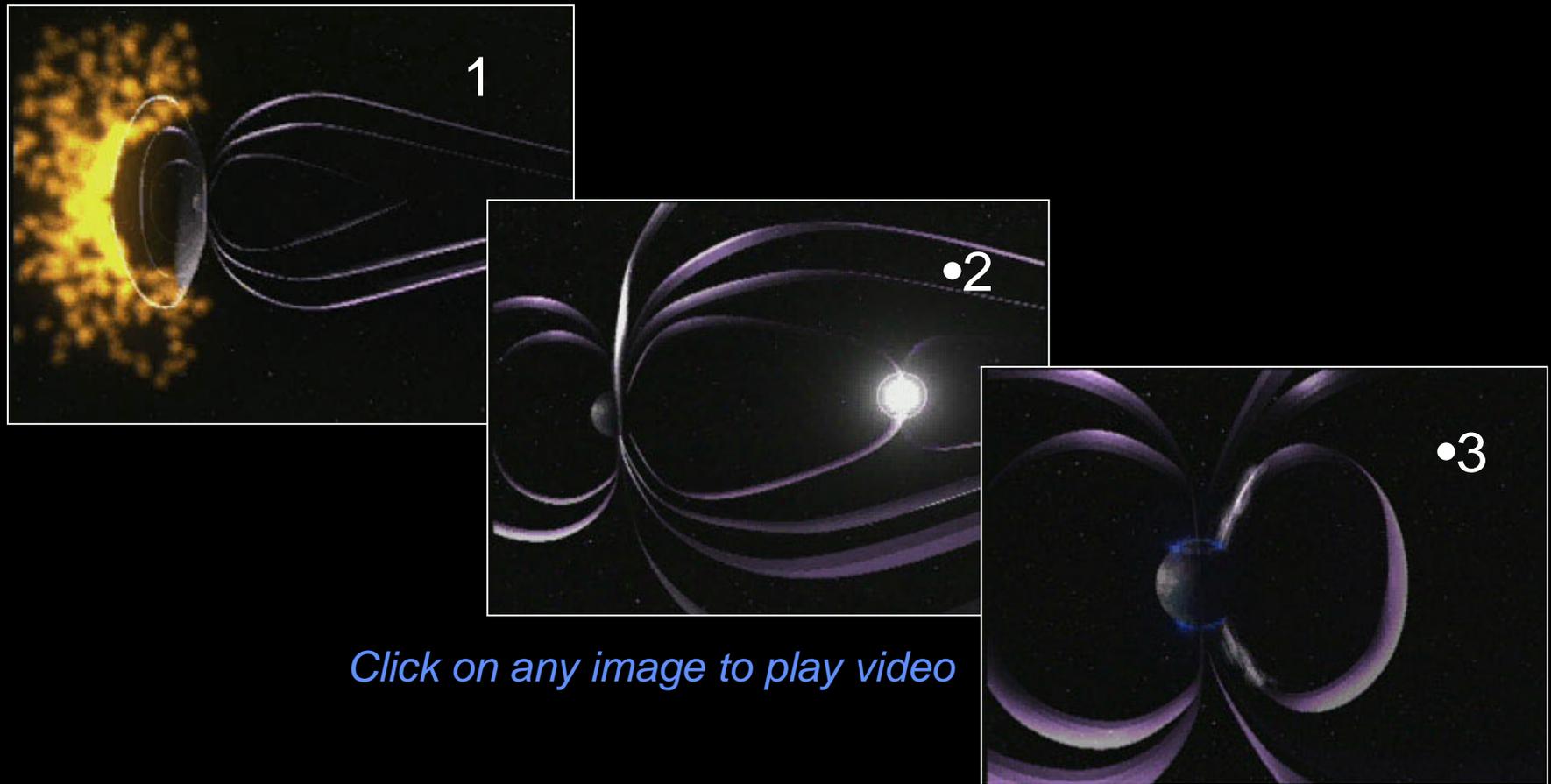
Our visible electrical  
connection to the Sun



# What are aurora?

- Aurora are shimmering, colorful curtains of light that sometimes glow in the night sky
- Although many theories existed, it wasn't until a hundred years ago that scientists discovered that they were caused by interactions with the Sun
- The solar wind carries charged particles from the Sun that excite gases in our upper atmosphere. These gases glow in different colors (like neon lights).

# How do they occur?



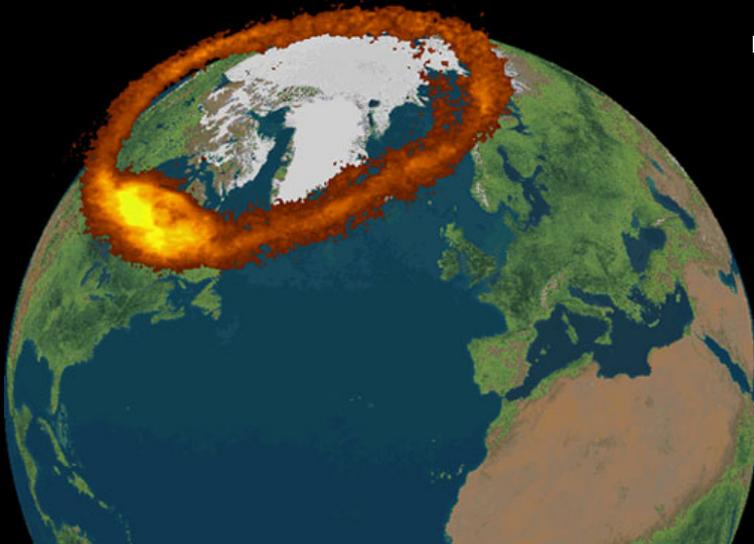
*Click on any image to play video*

This animation shows how: 1) a cloud of charged particles from the Sun breaks around the Earth's magnetosphere, 2) particles in our atmosphere become excited on the far side, and 3) are pulled to Earth along field lines near the poles

# Where are they?

- Remember that the Earth has its own magnetic field, like a magnet, with magnetic field lines extending out around the North and South poles. This is where they are closest together and, therefore, the strongest.

*Click on image to play video*



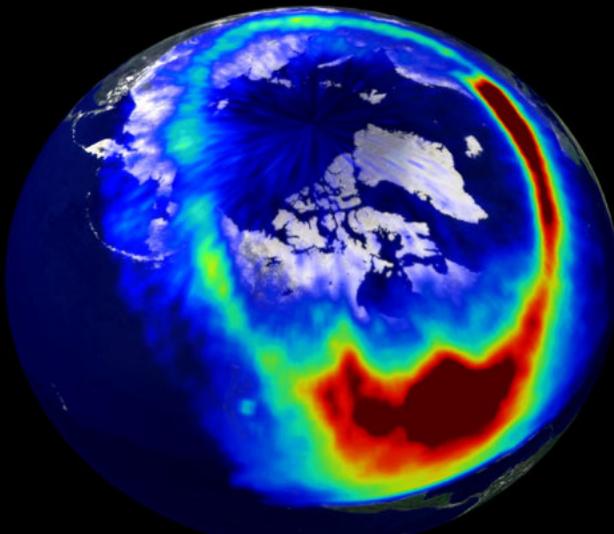
- The charged particles from the Sun interact with the Earth's upper atmosphere along the field lines, which form ovals around the two poles. Very strong aurora displays can sometimes extend down almost to the equator.



# Auroral oval

- This clip (right) shows a typical auroral oval surrounding the North Pole area. This is a real video taken from a spacecraft observing ultraviolet light.

*Click on image to play video*

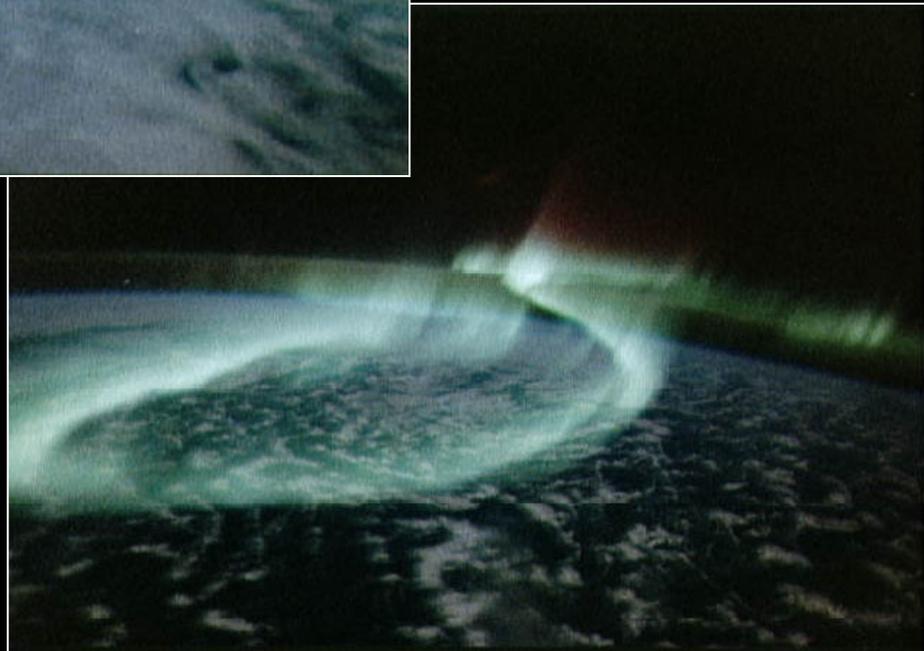


*Click on image to play video*

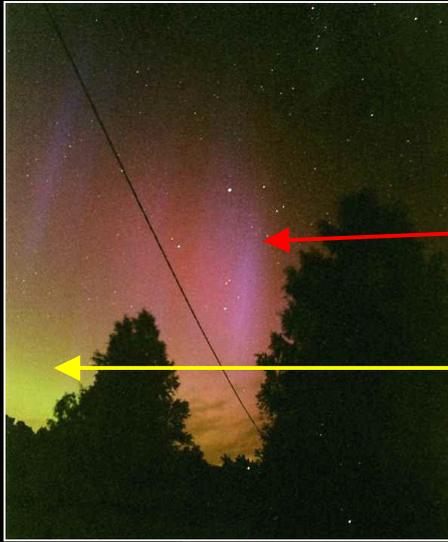
This auroral oval has been pushed down to Florida by a powerful magnetic storm in July, 2000. The most intense areas of magnetic activity are red.

# Aurora from space

The Space Shuttle in its low orbit is in a perfect position to photograph aurora from space. These side views reveal the depths of aurora.



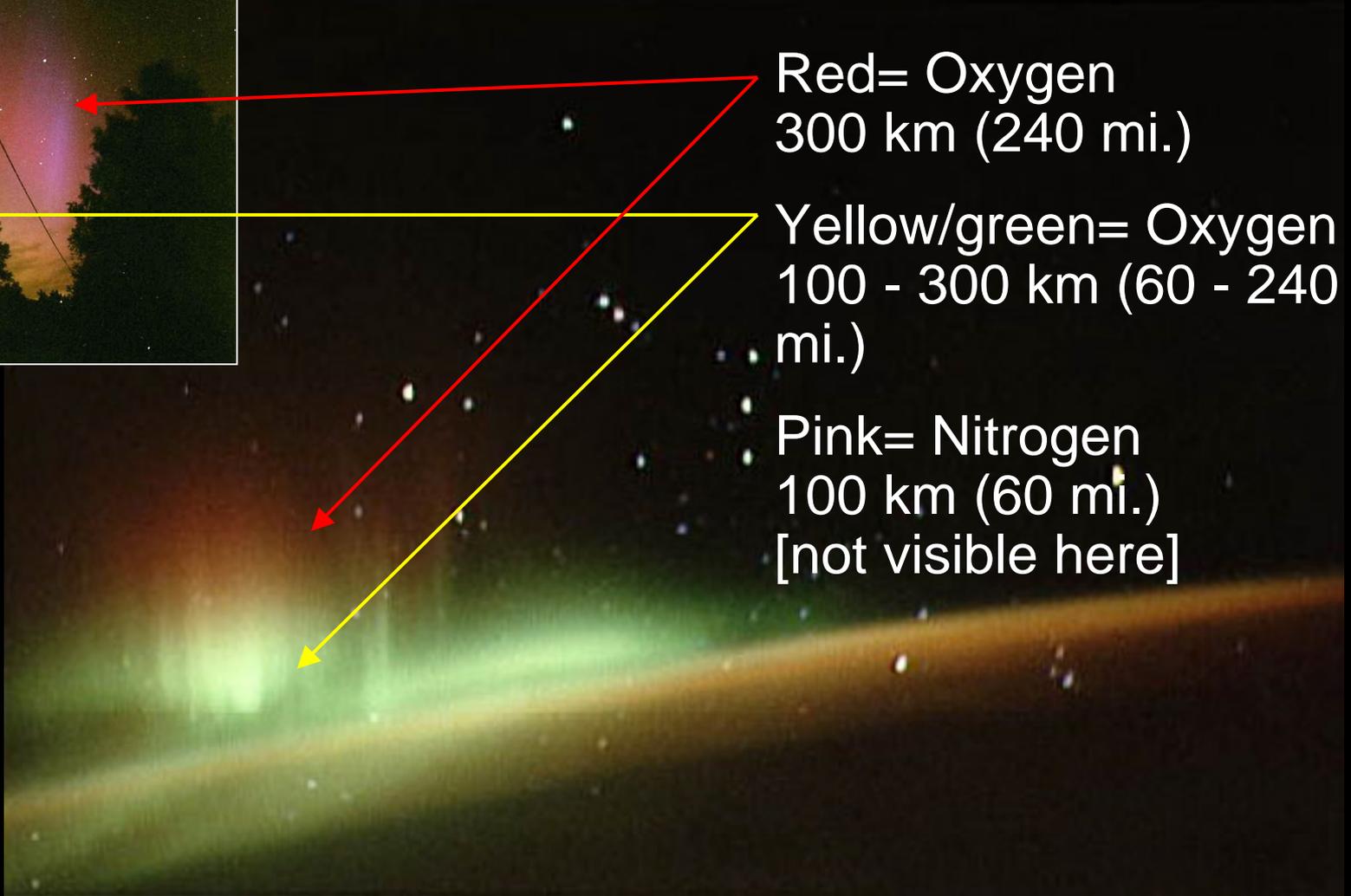
# Depth of an aurora



Red= Oxygen  
300 km (240 mi.)

Yellow/green= Oxygen  
100 - 300 km (60 - 240  
mi.)

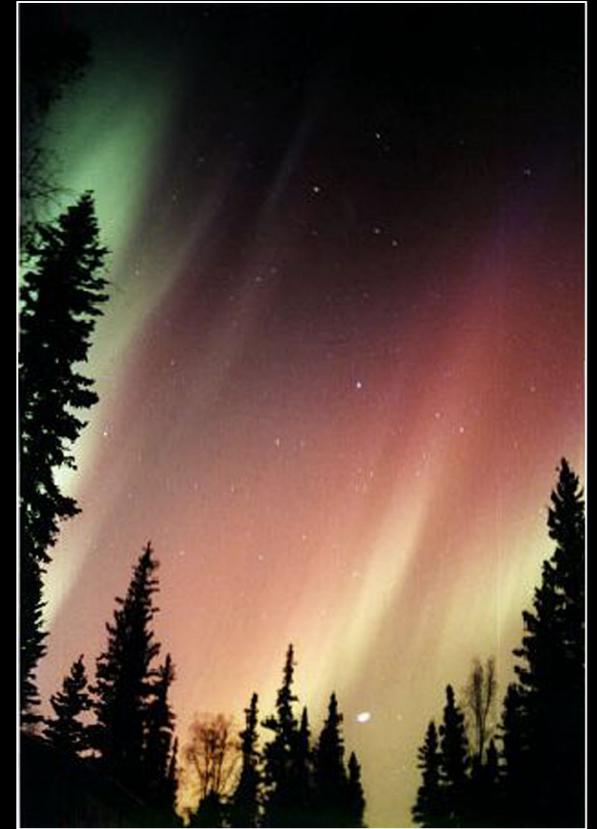
Pink= Nitrogen  
100 km (60 mi.)  
[not visible here]



Aurora as seen from space and Earth

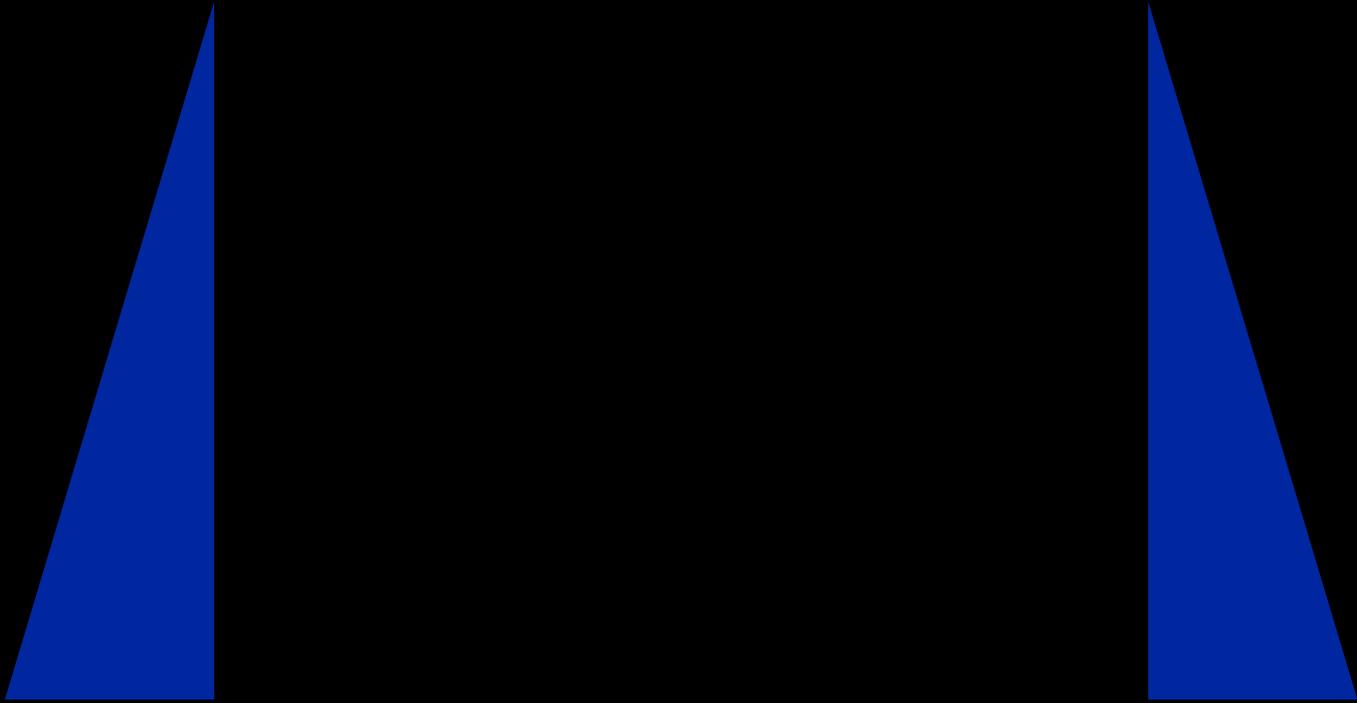


# More aurora photos



*Click on  
image to play  
video*

# Aurora video



Video of aurora taken in real-time  
(not speeded up or slowed down)