ASTRONOMY

NASA tracking solar winds that make Northern Lights

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BY KENNETH HICKS

During the holiday season, the thoughts of many youngsters turn toward the North Pole. Santa must have a fantastic view of one of the sky's most beautiful events, the aurora borealis (also called the Northern Lights).

This dancing color display, best seen in the night sky at far northern latitudes, is caused by particles, mostly protons and electrons, that stream from the surface of the sun. Known as the solar wind, these particles get captured in Earth's magnetic field, which funnels the particles toward the planet's poles.

When the solar wind meets the atmosphere, the gas ionizes. As the ions recapture electrons, they emit colors: Oxygen glows green, and nitrogen glows blue and red.

But what makes the aurora borealis dance across the sky? That is caused, in part, by gusting solar wind blown by the sun's turbulent surface. But just this year, NASA provided a more complete explanation using data from five satellites, jointly called THEMIS.

According to NASA, Earth's magnetic field stretches far into space where it gets twisted up. Sometimes the magnetic lines "break" and then reconnect, releasing enormous amounts of energy. Particles from the solar wind follow the magnetic field, giving the aurora borealis its flowing appearance.

The sudden release of energy from the reconnecting magnetic-field lines had been predicted by theoretical models of Earth, but it was first measured this year by a combination of the THEMIS satellites and ground-based observations.

In addition to explaining the beautiful Northern Lights, the THEMIS observations also benefit communication technology. The same power that triggers the aurora borealis also can disrupt radio communications and GPS signals.

Knowing when and where such disruptions will occur is important for communication networks.

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