Aurora Borealis and Aurora Australialis Encyclopedia Article

Aurora Borealis and Aurora Australialis

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Aurora Borealis and Aurora Australialis

The Aurora Borealis and Aurora Australialis are electromagnetic phenomena that occur near Earth's polar regions. The Aurora Borealis—also known as the "northern lights" (boreal derives from Latin for "north")—occurs near the northern polar regions. The Aurora Australialis is a similar phenomenon that occurs in southern polar regions.

Auroras are colored and twisting ribbons of light that appear to twist and gyrate in the atmosphere.

Auroras result from the interaction of Earth's **magnetic field** with ionic gas particles, protons, and electrons streaming outward from the **Sun**. Solar storms result in magnetic disturbances that lead to coronal mass ejections (CMEs) of ionic charged particles in solar "winds." As the magnetic particles pass Earth, the plasma streams (streams of charged particles) interact with Earth's magnetosphere (magnetic field). The magnetic interactions excite electron transitions that result in the emission of visible light.

Charged particles may also travel down Earth's magnetic field lines into Earth's **ionosphere**. As the charged particles interact with charged atmospheric gases in Earth's ionosphere, the electrons in the gases move to higher energy states. As the excited electrons return to their ground state, light photons are emitted. The colors of light correspond to particular frequencies and wavelengths generated by the energy of particular electron orbital transmissions, and are unique to different gaseous compounds. **Oxygen** atoms tend to give off red and greenish light. Nitrogen tend to produce wavelengths light in the bluish region of spectrum.

Although they may form anywhere, auroras are usually found in ring like regions (auroral rings or auroral ovals) that surround Earth's poles. Auroral rings or ovals are readily visible from **space**. Auroras are normally associated with the polar regions because it there where the magnetic field lines of Earth converge and are of the highest density.

The auroras also generate high levels of **electricity** that can exceed 100,000 megawatts within a few hours and sometimes interfere with communications equipment and/or signal transmission or reception.

Aurora Borealis, one of the great wonders of the natural world. FMA. ***Reproduced by permission.***

See Also

Atmospheric Chemistry; Atmospheric Composition and Structure; Atomic Theory; Atoms; Bohr Model; Chemical Elements; Coronal Ejections and Magnetic Storms;

Electricity and Magnetism; Electromagnetic Spectrum; Quantum Electro-Dynamics (Qed); Solar Sunspot Cycles