



Glossary

INDEX OF SUBJECT CATEGORIES:

- A** - [Active](#), [Active Region](#), [Angstrom](#), ...
- B** - [Bartels Rotation Number](#), [Burst](#), ...
- C** - [Chromosphere](#), [Coordinated Universal Time](#), ...
- D** - [Differential Rotation](#), [Disk](#), ...
- E** - [Eclipse](#), [Emerging Flux Region](#), [Eruptive](#) ...
- F** - [F Corona](#), [Facula](#), [Fibril](#), ...
- G** - [Gamma](#), [Gamma Ray](#), [Gauss](#), ...
- H** - [H-alpha](#), [Heliocentric](#), [High Frequency](#), ...
- I** - [Interplanetary Magnetic Field](#), [Ionosphere](#), ...
- K** - [K Corona](#), [Kelvin](#), ...
- L** - [Leaderspot](#), [Limb](#), ...
- M** - [Magnetogram](#), [Magnetopause](#), [Magnetosphere](#)
- N** - [Nanotelsa](#)
- P** - [Penumbra](#), [Photosphere](#), [Plage](#), ...
- Q** - [Quiet](#)
- R** - [Radio Emission](#), [Recurrence](#), ...
- S** - [Solar Coordinates](#), [Solar Cycle](#), ...
- T** - [Transition Region](#)
- U** - [Umbra](#), [Universal Time](#), ...
- V** - [Very High Frequency](#), [Very Low Frequency](#)
- W** - [White Light](#), [Wolf Number](#)
- X** - [X-ray Burst](#), ...
- Z** - [Zurich Sunspot Classification](#)



Would you like more perspective about these solar phenomena? We present some of the Sun's **vital statistics** with a "down-to-Earth" perspective here.

Active.

Solar activity levels with at least one geophysical event or several larger radio events per day.

Active Region (AR).

A localized, transient volume of the solar atmosphere in which [plages](#), [sunspots](#), [faculae](#), [flares](#), etc. may be observed.

Angstrom.

A unit of length = 1.0E-08cm.

Astronomical Unit (AU).

The mean Earth-Sun distance, equal to 1.496E+13cm or 214.94 solar radii.

Aurora.

A faint visual (optical) phenomenon on the Earth associated with geomagnetic activity, which occurs mainly in the high-latitude night sky. Typical auroras are 100 to 250 km above the ground. The Aurora Borealis occurs in the northern hemisphere and the Aurora Australis occurs in the southern hemisphere.

Bartels Rotation Number.

The serial number assigned to 27-day recurrence periods of solar and geophysical parameters. The equatorial rotation rate of the Sun is very close to 27 days. Rotation 1 Day 1 in this sequence was assigned arbitrarily by J. Bartels to February 8, 1832.

Burst.

A transient enhancement of the solar [radio emission](#), usually associated with an [active region](#) or [flare](#).

Chromosphere.

The layer of the solar atmosphere above the [photosphere](#) and beneath the transition region and the [corona](#). It is seen during eclipses as a bright red ring around the Sun, and the term *burning prairie* has been used to describe it.

Coordinated Universal Time.

By international agreement, the local time at the prime meridian, which passes through Greenwich, England. Therefore, it is also known as [Greenwich Mean Time](#), or sometimes simply [Universal Time](#).

Corona.

The outermost layer of the solar atmosphere, characterized by low densities ($<1.0E+09/cm^3$) and extraordinarily high temperatures ($>1.0E+06$ degrees K) that extends to several solar radii. The heating of the corona is still a mystery. The shape of the corona is different at [solar maximum](#) and at [solar minimum](#).

Coronal Hole.

An extended region of the [corona](#), exceptionally low in density (large open "gaps"), and associated with photospheric regions. Coronal holes are closely associated with those regions on the Sun that have an "open" magnetic geometry, that is, the magnetic field lines associated with them extend far outward into interplanetary space, rather than looping back to the [photosphere](#). Ionized material can flow easily along such a path, and this in turn aids the mechanism that causes [high speed solar wind streams](#) to develop.

Coronal Mass Ejection (CME).

An observable change in [coronal](#) structure that occurs on a time scale between a few minutes and several hours, and involves the appearance of a new discrete, bright, [white light](#) feature in the coronagraph field of view, that displays a predominantly outward motion. The solar corona material is massive in size (they can occupy up to a quarter of the solar [limb](#)), and frequently accompanied by the remnants of an eruptive [prominence](#), and less often by a strong solar [flare](#). The leading edges of fast-moving CMEs drive giant shock waves before them through the [solar wind](#) at speeds up to 1200 km per second. Some astronomers believe that CMEs are the crucial link between a solar disturbance its propagation through the [heliosphere](#), and the effects on the Earth.

Differential Rotation.

The change in [solar rotation rate](#) with latitude. Low latitudes rotate at a faster angular rate (approx. 14 degrees per day) than do high latitudes (approx. 12 degrees per day). For example, the equatorial rotation period is 27.7 days compared to 28.6 days at latitude 40 degrees.

Disk.

The visible surface of the Sun (or any heavenly body) projected against the sky.

Eclipse.

Eclipses occur when the Sun, Moon, and Earth precisely line up. The Moon, in its orbit around the Earth, is inclined at about 5 degrees to the ecliptic (the plane at which the Earth orbits the Sun). Therefore the Moon spends most of its time above or below the ecliptic plane. The Sun must be at a precise location too. Since the Sun travels an apparent path around the celestial sphere once per year, eclipses are possible only at roughly six-month intervals.

Emerging Flux Region (EFR).

An area on the Sun where new magnetic flux is erupting.

Eruptive.

Solar activity levels with at least one radio event and several chromospheric events per day.

Extremely Low Frequency (ELF).

That portion of the radio frequency spectrum from 30 to 3000 hertz.

Extreme Ultraviolet (EUV).

A portion of the electromagnetic spectrum from approximately 100 to 1000 angstroms.

F Corona. (Fraunhofer Corona)

Of the [white light corona](#) (that is, the corona seen by the eye at a total solar (eclipse), that portion which is caused by sunlight scattered or reflected by solid particles (dust) in interplanetary space. The F corona extends from the solar corona from about two or three solar radii far beyond the Earth into space, so that it can actually be seen at night as a faint glow along the ecliptic, the glow is known as zodiacal light.

Facula.

A bright cloud-like feature located a few hundred km above the [photosphere](#) near sunspot groups, seen in [white light](#). Facula are seldom visible except near the solar [limb](#), although they occur all across the Sun. Facula are clouds of emission that occur where a strong magnetic field creates extra heat (about 300 degrees K above surrounding areas).

Fibril.

A linear pattern in the [H-alpha chromosphere](#) of the Sun, as seen through an [H-alpha](#) filter, occurring near strong [sunspots](#) and [plages](#) or in [filament](#) channels.

Filament.

A mass of gas suspended over the [photosphere](#) by magnetic fields and seen as dark lines threaded over the solar [disk](#). A filament on the [limb](#) of the Sun seen in emission against the dark sky is called a [prominence](#).

Flare.

A sudden eruption of energy on the solar [disk](#) lasting minutes to hours, from which radiation and particles are emitted.

Flux.

The rate of flow of a physical quantity through a reference surface.

Foreshortening.

The fractional area of the solar (or a stellar) disk occupied by a circular spot, such as a sunspot, varies as the star rotates because of projection onto the line of sight.

Gamma.

A unit of magnetic field intensity equal to $1 \times 10.0E-05$ [gauss](#), also equal to 1 [nanotesla](#).

Gamma Rays.

High energy radiation (energies in excess of 100 keV) observed during large, extremely

energetic solar [flares](#).

Gauss.

The unit of magnetic induction in the cgs (centimeter-gram-second) system.

Geomagnetic Field.

The magnetic field observed in and around the Earth. The intensity of the magnetic field at the Earth's surface is approximately 0.32 gauss at the equator and 0.62 gauss at the north pole.

Geomagnetic Storm.

A worldwide disturbance of the Earth's magnetic field, distinct from regular diurnal variations.

Geocentric.

Centered on the Earth.

Geosynchronous.

Term applied to any equatorial satellite with an orbital velocity equal to the rotational velocity of the Earth. The net effect is that the satellite is virtually motionless with respect to an observer on the ground.

GMT.

Greenwich Mean Time. (See [Coordinated Universal Time](#).)

Granulation.

Cellular structure of the solar [photosphere](#) visible at high spatial resolution.

Green Line.

The green line is one of the strongest (and first-recognized) visible coronal lines. It identifies moderate temperature regions of the [corona](#).

H-alpha.

This absorption line of neutral hydrogen falls in the red part of the visible spectrum and is convenient for solar observations. The H-alpha line is universally used for observations of solar flares.

Helicity.

The helicity of an object is the measure of "twist" it has, such as the degree of coiling of a magnetic field. A more [mathematical description of helicity](#).

Heliocentric.

Centered on the Sun.

Heliopause.

The region in space where the Sun's atmosphere merges with interstellar space. The position of the heliopause depends both on the strength of the [solar wind](#) and on the properties of the local interstellar medium. Note also that data from [Ulysses](#) during [solar minimum](#) have shown that the solar wind from the Sun's poles has a higher speed than the speed in the ecliptic, so then the heliopause should be further from the Sun in the polar direction.

[Helioseismology.](#)

A method for studying the Sun by utilizing waves that propagate throughout the star to measure its invisible internal structure and dynamics.

Heliosphere.

The region in space that extends to the heliopause. The heliosphere is the cavity around the Sun in the local interstellar medium that is produced by the solar wind. The heliosphere contains most of the solar system, but not the most distant comets, such as in the Oort cloud.

High Frequency (HF).

That portion of the radio frequency spectrum between between 3 and 30 MHz.

High-Speed Stream.

A feature of the [solar wind](#) having velocities that are about double average solar wind values.

Interplanetary Magnetic Field (IMF).

The magnetic field carried with the [solar wind](#). Once the solar wind has passed the radius where its kinetic energy density is equal to that of the solar magnetic field, its particles will move out into the [interplanetary medium](#) carrying the solar magnetic field with them. Beyond that critical radius, the solar wind particles move in a straight line with constant velocity to a good approximation, but because the Sun is rotating and with it the footprints of the magnetic field lines, the magnetic field takes up a spiral structure known as an Archimedean spiral.

Interplanetary Medium.

The material in between the planets in the solar system, including that within the Earth's radius and out to and beyond the outer planets. It contains not only the smaller objects in the solar system, such as asteroids, comets, meteors, meteorites, but also a general interplanetary dust and interplanetary plasma.

Ionosphere.

The region of the Earth's upper atmosphere containing a small percentage of free electrons and ions produced by photoionization of the constituents of the atmosphere by solar ultraviolet radiation at very short wavelengths (less than 1000 angstroms). The ionosphere significantly influences radiowave propagation of frequencies less than about 30 MHz.

K Corona. (from "Kontinuum")

Of the [white light corona](#) (that is, the corona seen by the eye at a total solar eclipse), that portion which is caused by sunlight scattered by protons and free electrons in the hot outer atmosphere of the Sun. The K corona extends out to about 700,000 km from the [photosphere](#). The K Corona's continuous spectrum resembles the photospheric spectrum, but the Fraunhofer lines are absent.

Kelvin.

A unit of absolute temperature.

Leader Spot.

In a magnetically bipolar or multipolar [sunspot](#) group, the western part precedes and the main spot in that part is called the leader.

Limb.

The edge of the solar [disk](#).

Limb Darkening.

The visible disk of the Sun does not appear uniformly bright, with the radiation from the edge or limb being less intense than that from the center. The radiation reaching the observer from the solar limb has left the Sun at a large angle to the vertical. Radiation moving in the vertical direction is more intense than radiation moving at an angle to the vertical and as a result, the edge of the disk appears darker than the center.

Limb Flare.

A solar [flare](#) seen at the edge ([limb](#)) of the Sun.

Low Frequency (LF).

That portion of the radio frequency spectrum from 30 to 300 kHz.

Magnetogram.

Solar magnetograms are a graphic representation of solar magnetic field strengths and

polarity.

Magnetopause.

The boundary layer between the [solar wind](#) and the [magnetosphere](#).

Magnetosphere.

The magnetic cavity surrounding the Earth, carved out of the passing [solar wind](#) by virtue of the [geomagnetic field](#), which prevents, or at least impedes, the direct entry of the [solar wind plasma](#) into the cavity.

MeV.

Mega (million) electronvolt. A unit of energy used to describe the total energy carried by a particle or photon.

Medium Frequency. (MF).

That portion of the radio frequency spectrum from 0.3 to 3 MHz.

Mount Wilson Magnetic Classifications.

Alpha. Denotes a unipolar [sunspot](#) group.

Beta. A sunspot group having both positive and negative magnetic polarities, with a simple and distinct division between the polarities.

Beta-Gamma. A sunspot group that is bipolar but in which no continuous line can be drawn separating spots of opposite polarities.

Delta. A complex magnetic configuration of a solar sunspot group consisting of opposite polarity [umbrae](#) within the same [penumbra](#).

Gamma. A complex [active region](#) in which the positive and negative polarities are so irregularly distributed as to prevent classification as a bipolar group.

Nanotesla (nT).

A unit of magnetism 10.0E-09 tesla, equivalent to a gamma (10.0E-05 gauss).

Penumbra.

The [sunspot](#) area that may surround the darker [umbra](#) or umbrae. It consists of linear bright and dark elements radial from the sunspot umbra.

Photosphere.

The lowest layer of the solar atmosphere; corresponds to the solar surface viewed in [white light](#). [Sunspots](#) and [faculae](#) are observed in the photosphere.

Plage.

An extended emission feature of an [active region](#) that exists from the emergence of the first magnetic flux until the widely scattered remnant magnetic fields merge with the background. This bright feature is found in the vicinity of virtually all active [sunspot](#) groups and occurs on a larger scale and are brighter than [facula](#). Plage is French for "beach," because each plage looks like light-colored sand against the darker structures around them.

Plasma.

Any ionized gas, that is, any gas containing ions and electrons.

Prominence.

A term identifying cloud-like features in the solar atmosphere. The features appear as bright structures in the [corona](#) above the solar [limb](#) and as dark [filaments](#) when seen projected against the solar [disk](#).

Quiet.

Solar activity levels with less than one chromospheric event per day.

Radio Emission.

Emissions of the Sun in radio wavelengths from centimeters to dekameters, under both quiet and disturbed conditions.

Recurrence.

Used especially in reference to the recurrence of physical parameters every 27 days (the rotation period of the Sun).

Solar Coordinates.

Central Meridian Distance (CMD). The angular distance in solar longitude measured from the central meridian.

Solar Cycle.

The approximately 11-year quasi-periodic variation in frequency or number of solar active events.

Solar Maximum.

The month(s) during the [solar cycle](#) when the 12-month mean of monthly average [sunspot](#) numbers reaches a maximum. The most recent solar maximum occurred in July 1989.

Solar Minimum.

The month(s) during the [solar cycle](#) when the 12-month mean of monthly average [sunspot](#) numbers reaches a minimum. The most recent minimum occurred in November 1996 (??).

Solar Rotation Rate.

The rate at which the Sun rotates on its axis. The rotation rate varies with latitude (called [differential rotation](#)).

Solar Wind.

The outward flux of solar particles and magnetic fields from the Sun. The solar wind is produced primarily in the cooler regions of the [corona](#), known as [coronal holes](#), and flows along the open magnetic field lines. Typically, solar wind velocities are 300-500 km per second.

Spicules.

Short-lived (lifetime from rising to falling is about 15 minutes) jets vertical to the solar surface that are several thousand kilometers long and about 1 kilometer thick. The birth rate is comparable to [granules](#) and there are hundreds of thousands of spicules on the Sun. [Reference: Zirin: The Solar Atmosphere_, pg. 219, 1966.]

Sunspot.

An area seen as a dark spot on the [photosphere](#) of the Sun. Sunspots are concentrations of magnetic flux, typically occurring in bipolar (i.e. two-part with positive and negative poles like a magnet) clusters or groups. They appear dark because they are cooler than the surrounding photosphere.

Sunspot Butterfly Diagram.

The pattern of sunspots that show a time distribution concentrated in 35 degree wide belts on each side of the solar equator. The earlier spots in the [solar cycle](#) appear at higher latitudes and the later spots in the solar cycle emerge nearer to the equator.

Sunspot Group Classification.

(Modified Zurich Sunspot Classification).

- A - A small single unipolar [sunspot](#) or very small group of spots without [penumbra](#).
- B - Bipolar sunspot group with no penumbra.

- C - An elongated bipolar sunspot group. One sunspot must have penumbra.
- D - An elongated bipolar sunspot group with penumbra on both ends of the group.
- E - An elongated bipolar sunspot group with penumbra on both ends. Longitudinal extent of penumbra exceeds 10 deg. but not 15 deg.
- F - An elongated bipolar sunspot group with penumbra on both ends. Longitudinal extent of penumbra exceeds 15 deg.
- H - A unipolar sunspot group with penumbra.

Sunspot Number.

A daily index of [sunspot](#) activity (R), defined as $R = k (10 g + s)$ where S = number of individual spots, g = number of sunspot groups, and k is an observatory factor.

Supergranulation.

A large-scale convection pattern, characteristic size of about 30,000 km (2 1/2 times the diameter of the Earth) with a lifetime of about one day.

Surge.

A jet of material from [active regions](#) that reaches coronal heights and then either fades or returns into the [chromosphere](#) along the trajectory of ascent.

Transition Region.

The transition region is the very narrow region of the solar atmosphere that separates the [chromosphere](#) and [corona](#), where the temperature rises sharply from 20,000 to nearly a million Kelvin degrees.

U Burst.

A fast radio burst spectrum of a [flare](#). It has a U-shaped appearance in an intensity-vs.-frequency plot.

Ultra High Frequency (UHF).

Those radio frequencies exceeding 300 MHz.

Umbra.

The dark core or cores (umbrae) in a [sunspot](#) with [penumbra](#), or a sunspot lacking [penumbra](#).

Universal Time (UT).

See [Coordinated Universal Time](#).

Very High Frequency (VHF).

That portion of the radio frequency spectrum from 30 to 300 MHz.

Very Low Frequency (VLF).

That portion of the radio frequency spectrum from 3 to 30 kHz.

White Light (WL).

Sunlight integrated over the visible portion of the spectrum (4000 - 7000 angstroms) so that all colors are blended to appear white to the eye.

Wolf Number.

An historic term for [sunspot number](#). In 1849, R. Wolf of Zurich originated the general procedure for computing the sunspot number.

X-ray Burst.

A temporary enhancement of the X-ray emission of the Sun. The time-intensity profile of soft X-ray bursts is similar to that of the [H-alpha](#) profile of an associated [flare](#).

Many of the glossary terms on this page originated from a more technical glossary, located at [NOAA](#). (We recommend that page for more a detailed technical glossary.)

Search

[Home](#) · [Request Solar Posters](#) · [Site Map](#) · [Glossary](#) · [About Us](#) · [Contact Us](#)

©2008 by Stanford SOLAR Center · [Permitted Uses](#) · [Credits](#)