

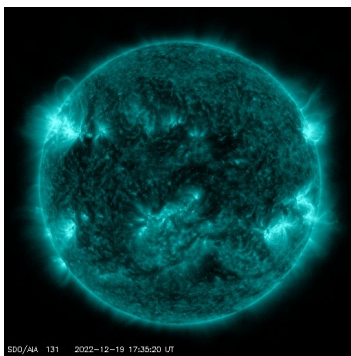
Astro_Nerd

by Tink-rs

GNU GPLv3 – 2022

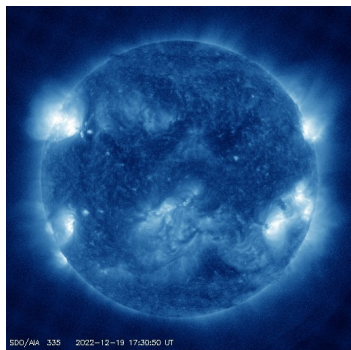
Information Guide

Solar Image Meanings



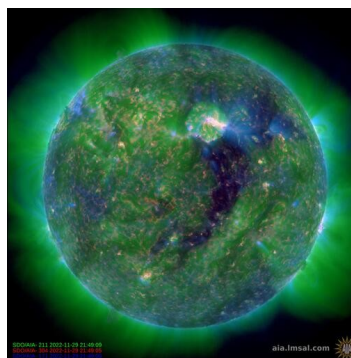
A1A 0131

This channel is designed to study solar flares. It measures extremely hot temperatures around 10 million K (18 million F), as well as cool plasmas around 400,000 K (720,000 F). It can take images every 2 seconds (instead of 10) in a reduced field of view in order to look at flares in more detail.



A1A 0335

This channel highlights the active region of the outer atmosphere of the Sun - the corona. Active regions, solar flares, and coronal mass ejections will appear bright here. The dark areas - or coronal holes - are places where very little radiation is emitted, yet are the main source of solar wind particles.



A1A 304, 211, 171

This image combines three images with quite different temperatures. The colors are assigned differently than in the single images. Here AIA 304 is red (showing the chromosphere), AIA 211 is green (corona), and AIA 171 is dark blue (corona).

The Solar Graphs

(In order as they appear in the Conky widget) Full name is followed by abbreviated name on the graph

Solar Flux Index – **SFI**

A Index – **A**

K Index – **K**

Protons – **Ptn**

Electrons – **Etn**

Fof2 – **Fof2**

MUF – **MUF**

MUF Factor – **MF**

The flux graphs basically keep us updated on solar storm activity

Solar Flux Index - closely equivalent to actual Sunspot Number (SN) It is measured in solar flux units (SFU) and is the amount of radio noise or flux that is emitted at a frequency of 2,800 MHz (10.7 cm). SFI is closely related to F2 region ionosphere activity. See Fof2 below.

A and K-index relate to disturbances in Earth's geomagnetic field. Occasionally the sun shoots out a solar flare and Earth's magnetic field is disturbed.

A index is the raw measured data and varies in the wide range.

K index – is the A Index “smoothed out”. When you see the K index higher than 5, it is considered a storm condition and the result is bad HF radio wave propagation.

Protons and **Electrons** make up part of the solar wind plasma. These fluctuate according to solar activity.

These last 3 factors relate to interference in communications due to solar activities and solar storms.

Fof2 - F layer of the Ionosphere is mostly responsible for the reflection of radio waves back to Earth. Variations of the ionospheric F2 region critical frequency (foF2) have been investigated statistically before earthquakes as well.

MUF, MUF Factor - represent the “Maximum Usable Frequencies” in correlation to radio/communications.

Note about the sun graphs:

I've adjusted the output of the graphs to show ranges within their average/normal values. When it shows being "high", it's showing high within it's average/normal range. Otherwise, the data output wouldn't register much on the graph.

Always look to the data output listed below each graph (a numerical value) for the true value.

Sun Data Output (upper area of Sun section)

Aurora – these numbers correlate to the sun/earth connection. Auroras can be seen, such as the Aurora Borealis (Northeren Lights)

XRay – measures current x-ray emissions

Sun spots – cool spots on the sun's surface

Magnetic Field – the sun is a giant magnetic star, made of material that moves in concert with the laws of electromagnetism. This is a measure of the fluctuation.

GeoMag Field – measures Earth's geomagnetic field which can vary greatly depending on solar activity. Our magnetic field is disturbed by solar bursts of radiation and charged particles.

Solar wind is a stream of charged particles released from the upper atmosphere of the Sun, called the corona. The corona plasma consists of electrons, protons and alpha particles with kinetic energy. between 0.5 and 10 keV The composition of the solar wind plasma also includes a mixture of materials found in the solar plasma: trace amounts of heavy ions and atomic nuclei such as C, N, O, Ne, Mg, Si, S, and Fe.

Note about the sun graphs: occasionally certain data isn't available for a day or two (particularly the MUF or MUF Factor), in which case the data feed reports "No Report". I've scripted the code to replace "No Report" with a value of 1 so the graphs will still operate. But K Index often has a normal value of 1. So, when you see "1" for the K Index, it is the current actual value.

ASTEROID DATA

Displays the 5 closest approaching asteroids arranged by the date they pass by Earth. The soonest passing asteroid is the first displayed, along with graphs. The larger the size graph, the larger the asteroid. The larger the distance graph, the closer to Earth it's passing.

The size graph will show the alarm color when the asteroid is as large (or larger) than a building (over 220 ft or 67 m). The distance graph is show alarm color when the asteroid is “dangerously” close (less than 500,000 m or 350,000 km).

MOON DATA

The “next full moon” name is based on North American Indigenous names.

Be certain to select your hemisphere (instructions in the set-up guide), as the moon images are flipped depending on what hemisphere you reside in.

Happy **AstroNerd**-ing everyone!!

Side note: *The sun data is available as a separate conky widget called “SolarSpy” (Yes, I wrote it.)*

Asteroid_Watch and MoonMini are in the works as individual widgets and will be released shortly.