

# Solar Core and Photosphere Temperatures

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## Abstract

Understanding how the ethereal solar corona has hyper-hot temperatures also points us to the sun's extremely energetic core. How do hyper-hot core photons appear to radically cool as they rise to populate the much cooler photosphere? This heat mystery (with the sun's photosphere at the cooler bottom of the "v" ) helps reveal how its corona heats up so much far above the surface. In this way two great questions are resolved by one eloquent model.

I recommend that you read first my recently completed essay on [how the solar corona heats up](#) above the photosphere. This second essay you are now reading could have been written first, as both energy dialectics are essentially entwined. Briefly, this second essay is about how short rays become longer – and the first essay is about how some long rays become shorter.

What we are talking about is the fate of core gamma rays and neutrinos, along with myriad emerging visual-frequency photons. Their paths determine how Earth's many life forms amazingly have evolved over billions of years.

Ancestral people standing on Earth looking at our star saw a disk of about 1/2 degree in diameter on the “celestial dome.” Its reference-frame span is by coincidence very close to what our full moon likewise displays. This perspectives rarity has provided fodder for much astrology and other pre-scientific ideas. The astrophysical truth is much more amazing than pre-scientific flights of fancy, however pseudo-logical.

Our sun is huge compared to Earth. About 1.3 *million* Earths could fit inside the sun’s photospheric volume. In contrast, our single moon is smaller than Earth, but much closer. It only looks equally large in the sky from our lucky geometric frame of visual reference. This visual pairing is unique in the solar system, and likely rare elsewhere. Meanwhile, next year (2024) the [Great American Solar Eclipse](#) will entertain and amaze millions of us in North America, with the ethereal solar corona glow being the great visual prize at totality.

Modern astrophysics knows far more critical facts than anybody could imagine during Einstein’s early career. Some fairly distant objects have had to be renamed: The great Andromeda Spiral Nebula (M-31) has revealed itself as a vast gravity realm with billions of stars, similar in mass to our Milky Way, including many real gas nebulae within.

Twenty-first-century astrophysics is synergized by emerging theory and experimental discoveries. One of the main areas of interest remains the solar core, where all the hot “action” begins. Energy that shoots out from the hyper-hot core will dialectically transform multiple times – yielding the v-shaped temperature profile, to where the distal corona shines with temperatures that can rival those found inside the dense core itself.

Of critical importance, the sun’s core does not initially produce mostly harmless and beneficial visible photons. The solar core’s production of electromagnetic (EM) frequencies tends toward very short gamma-ray frequencies. *If the sun were to simply direct outward these initial ultra frequencies in the amount that they*

*actually do as visible photons, life on Earth would be sterilized, if it had ever formed in the first place.* The Earth's electromagnetic shields would have been vastly overwhelmed. Lethal gamma-ray radiation, along with enhanced coronal mass ejections, would sterilize our surface, much as what happened with Mars' surface after its magnetic shields weakened about three billion years ago.

Early Mars did have a wet and possibly life supporting surface for several hundred million years, which would have provided sufficient time for Earth and Mars to share fertile rock specks ejected by meteor impacts. Whether any common and simple life began first on Mars, or on Earth, has not yet been answered; but the clear truth could be discovered within the next thirty years.

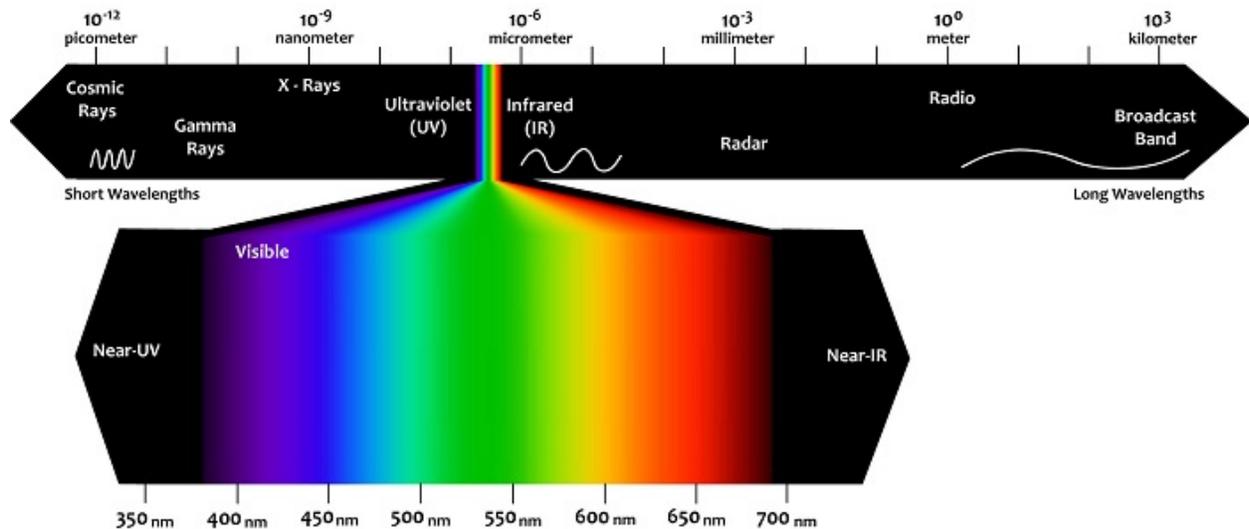
The question of primitive cellular life is less interesting than the question of truly intelligent and wise life. To date, it has not been established that life on either Mars or Earth has ever evolved up to the level of wisdom required to avoid global species suicide.

Neither Earth nor Mars would ever have hosted even simple life that may have arrived via comets *if* the internal sun did not convert most powerful gamma rays into rays with frequencies benign for us. The best that might have happened with a mostly gamma-ray sun (invisible to our ape eyes) is for simple life to survive on a distant planet or large moon, both with their own internal heat, inside remote regions of the Kuiper Belt.

## Frequencies and Photonic Energy

It is possible to [calculate the energies associated with different wave lengths and frequencies](#) that we can measure. It should be possible to calculate these ratios down to sub-Planck *yin/yang spheres with Coulombic virtual shells*; but for this essay we will stick with what experimentalists "know" from extrapolated data. (By way of comparison, read my discussion in the previous essay cited above regarding the key difference between forming black holes and new big bangs.)

Below is one of several ways to express how narrow is the part of the electromagnetic spectrum that is accessible to our natural eyes and optical instruments. The easy part of the EM frequency spectrum is primarily what arrives from the photosphere. These rays are benign enough for life to emerge and develop. On a scientific basis the "ROYGBIV" visual sliver is just a starting point for understanding how electromagnetism is so integral to how the full 4D multiverse works.



If you have noticed the progressive exit of visible colors during twilight outside in a dark-skies rural location, you will remember that green things seem to keep their color the longest, while everything else on the ground that is not black goes to gray. That is because our retinal cones are most sensitive toward the green and yellow parts of the visible spectrum. Perceiving far away in either direction of the EM spectrum requires a different set of tools and consciousness unavailable to our natural eyes.

There is a [clear relationship between photon frequencies and their energies](#), as the chart below illustrates. Infrared, for example, can be felt on top of an electric stove as heat during initial phases of energizing the hot plate. As the plate continues to get hotter the invisible heat waves are joined by visible red waves which have higher frequencies.

Toward higher frequencies other phenomena appear, mostly to instruments. The extreme levels of highly energetic frequencies exist in the gamma rays zone of 300 EHz and higher, which is where the photonic journey from solar core to Earth first begins.

CLASS	FREQUENCY	WAVELENGTH	ENERGY
γ	300 EHz	1 pm	1.24 MeV
HX	30 EHz	10 pm	124 keV
SX	3 EHz	100 pm	12.4 keV
EUV	300 PHz	1 nm	1.24 keV
NUV	30 PHz	10 nm	124 eV
	3 PHz	100 nm	12.4 eV
NIR	300 THz	1 μm	1.24 eV
MIR	30 THz	10 μm	124 meV
FIR	3 THz	100 μm	12.4 meV
EHF	300 GHz	1 mm	1.24 meV
SHF	30 GHz	1 cm	124 μeV
UHF	3 GHz	1 dm	12.4 μeV
VHF	300 MHz	1 m	1.24 μeV
HF	30 MHz	10 m	124 neV
MF	3 MHz	100 m	12.4 neV
LF	300 kHz	1 km	1.24 neV
VLF	30 kHz	10 km	124 peV
VF/ULF	3 kHz	100 km	12.4 peV
SLF	300 Hz	1 Mm	1.24 peV
ELF	30 Hz	10 Mm	124 feV
	3 Hz	100 Mm	12.4 feV

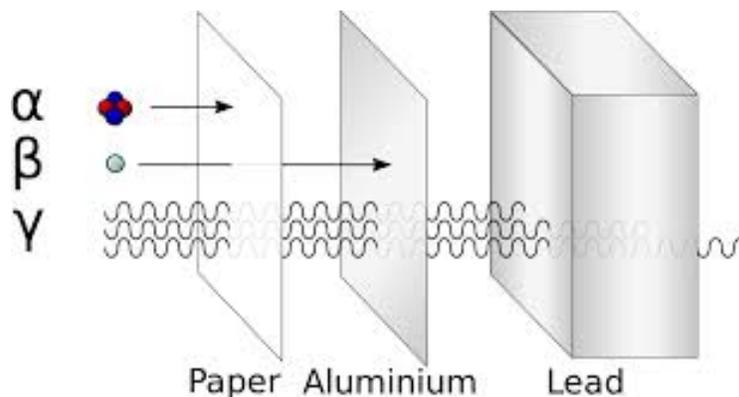
Gamma rays in the solar core are one product of fusion, which we *sorcerer's apprentices* have crudely used to invent hydrogen bombs. The bombs America dropped on Hiroshima and Nagasaki were *fission* atom bombs, yielding fairly puny explosive energy from splitting large atoms – not from *fusing* hydrogen protons to yield helium and certain subatomic particles with more energy.

Hydrogen bombs are the most absurdly evil example of science gone mad. Fortunately, [in no way can we sorcerer's apprentices, or even our sun, go all the way](#) toward destruction of our visible universe from any new fusion-gravity big bang.

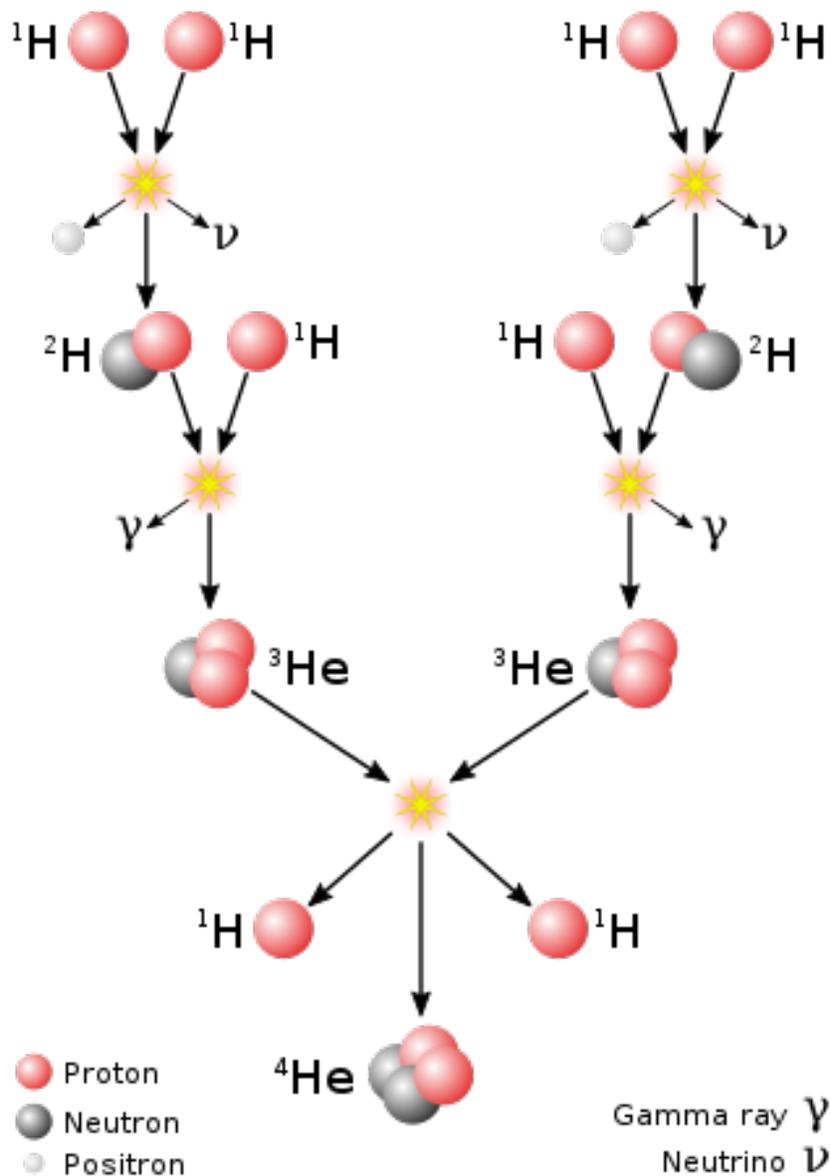
## Frequencies and Photonic Energy

The v-shaped model presented above, where hot yields cooler, and cooler yields hotter, before Earth gets its share of the cooled core energy, begins within the solar core. The first half of this model is where very hot cools down to a mere 10k Fahrenheit.

If the core-generated gamma rays directly passed out of the solar disk, and then radiated outward in all directions in vast numbers of energy/particles, then Earth would have no defense. Even Earth's magnetic shields would have been overwhelmed many millions of years ago. The visual below illustrates the relative penetrating power of gamma rays, beta ultraviolet, and alpha ultraviolet:



Here below is an illustration showing how gamma rays are created by nuclear fusion within the solar core. Note that initial EM creation is dialectically transformed over the millions of years it takes to reach the photosphere launching region:



In the above visual from [Wikipedia](#) we see some of what goes on inside the sun's core with the *proton-proton chain reaction*. In total, this fusion process releases tremendous energy which heats up the core to 15 million degrees Kelvin. In addition, some very important new tiny particles emerge: neutrons, positrons, as well as high-energy gamma rays, and neutrinos. The resulting neutrinos and gamma rays are essential to our temperature story of extremely high-energy (and high-frequency) waves converting to much cooler temperatures and lower frequencies.

I am not the first to mention *that* this frequency conversion occurs, which yields much more “earth-friendly” frequencies being most of what makes its way to Earth. However, my full thesis elegantly explains *how* this process works, along with what happens in the corona, all yielding the unique *v-shaped total-path energy curve*.

Here is the [NOAA Space Weather Prediction Center](#) describing the full outward process from hot core to less-hot photosphere:

“The Sun’s interior domain includes the core, the radiative layer, and the convective layer (Figure 2–1). The core is the source of the Sun’s energy, the site of thermonuclear fusion. At a temperature of about 15,000,000 K, matter is in the state known as a plasma: atomic nuclei (principally protons) and electrons moving at very high speeds. Under these conditions two protons can collide, overcome their electrical repulsion, and become cemented together by the strong nuclear force. This process is known as nuclear fusion, and it results in the formation of heavier elements as well as the release of energy in the form of gamma ray photons. The energy output of the Sun’s core is so large that it would shine about 10<sup>13</sup> times brighter than the solar surface if we could “see” it.

“The immense energy produced in the core is bound by the surrounding radiative layer. This layer has an insulating effect that helps maintain the high temperature of the core. *The gamma photons produced by fusion in the core are absorbed and re-emitted repeatedly by nuclei in the radiative layer, with the re-emitted photons having successively lower energies and longer wavelengths. By the time the photons leave the Sun, their wavelengths are mostly in the visible range.* The energy produced in the core can take as long as 50 million years to work its way through the radiative layer of the Sun! If the processes in the core of the Sun suddenly stopped, the surface would continue to shine for millions of years.”