Light comes from the sun

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Raindrops and ice crystals in the atmosphere can separate the light we see into its component wavelengths, which we recognize as the individual colors of the rainbow.

Some of the infrared energy that reaches Earth is absorbed by the atmosphere and some reaches Earth''s surface and isradiated back into the atmosphere as the surface warms. We tend to think of Infrared energy as heat, thoughInfrared radiation is not quite the same thing as heat.All objects warmer than absolute zero (-273?C) give off infrared energy, but in different amounts based on the object''s temperature.

Different objects (including yourself, the walls of a room, and the air) have different temperatures and therefore give off differing amounts of infrared energy, which can be seen using thermal goggles or an infrared sensor.

Your body tends to be warmer than the room you might be sitting in, so you are giving off more infrared energy than the walls behind you or the air around you. Both the air around you and the ground or floor beneath your feet both give off some infrared energy, and this is true even if the ground is frozen and feels quite cold.

Is it known what is the origin of this radiation? Can it be adequately described by classical electrodynamics (Maxwell''s equations) as a motion of electric charges in the Sun? Is it necessary to take into account quantum effects described by quantum electrodynamics? Or is it necessary to take into account other processes?

The photosphere of the Sun is in radiative equilibrium, getting neither hotter or colder on average.What this means is that the emission processes that produce the radiation that escapes from the photosphere, are the inverse of the absorption processes that stop radiation from deeper, hotter layers reaching us.

The principle of detailed balance means that these absorption processes are balanced by free-bound photorecombination of H$^-$ ions contributing light over a continuum of wavelengths and bound-bound downward transitions in atoms and ions at specific wavelengths.

Stars undergo nuclear fusion of chemical elements in their cores. The outward pressure of the resultant radiation and the thermal pressure from the plasma counter-act the impending collapse from the inward gravitational pressure of the star. Thus, a star is a delicate dance between outward and inward pressures. Eventually, the star runs out of nuclear fuel and the gravitational collapse wins over and the stars ends its life - depending on its mass and metallicity - as either a white dwarf star, a neutron star, or a black hole (or maybe even more exotic, undiscovered possibilities).

In terms of quantum mechanics there''s a rich history of scientific progress about stellar models. For a nice historical review, I recommend this article by Arny. Therein, he discusses how purely classical models prior to the 1900"s were used to try to estimate the age of the sun using thermodynamics. But this resulted in ~10^6 years, which they knew was incorrect due to the geological record. Some advancements were made in the thermodynamic understanding of plasmas by Jeans, Lambden and others.... But the real breakthrough came from quantum mechanics in two ways:

spectroscopy allowed for the precise characterization of stars according to their composition - certain wavelengths of light are emitted by certain energy differences of the states of certain atoms. This paved the way to a nuclear theory of how stars work.

Eddington and others computed how much energy would be required to keep the sun shining at its luminosity, and this led to numerous avenues of research. I won"t go into detail here, the article by Arny is great. But the punchline is that the energy could be acquired through a nuclear process (such as the proton-proton chain reaction which requires 4 hydrogen atoms to produce helium isotope in low-mass stars such as our sun, or the CNO cycle which is thought to dominate in higher mass stars, and this is a field of its own since the late 1930"s called stellar nucleosynthesis).

Eddington, in The Internal Constitution of the Stars (1926),calculated without knowing how the energy was released, the energy yield ofhydrogen burning. He further noted that hydrogen was the most efficient fuel interms of energy per gram and that it would be able to power the sun for some 100billion years.