

Nuclear Fusion

In short, nuclear fusion takes the atomic particles that make up two hydrogen atoms and smashes them together in order to make a new atomic particle of helium. It takes 4 hydrogen atoms to make just 1 helium atom. In order to make the protons and neutrons of hydrogen stick together to form the new helium the newly formed atom will give off a tremendous amount of energy. This energy makes the core of the star (in this case our Sun) extremely hot and produces the light that we see here on Earth.

At a star's core, the atoms are packed extremely densely (so they're quite close together). Combine this with the extreme heat of the core and the atoms move around very quickly and generally tend to slam into one another quite often. When they slam into one another like this they release their energy and produce helium.

In time, once all the hydrogen of a star is used up it will start to fuse the helium in the same way that it fused the hydrogen, producing carbon. It is believed that all stars are powered in this same basic method.

Nuclear fusion is not to be mistaken for nuclear fission. Nuclear fission occurs when a heavy and unstable mass such as U^{235} splits into smaller and more stable nuclei. This is caused by firing the nucleus with particles of suitable energy called projectiles. So, nuclear fission is nowhere near the same as the nuclear fusion that powers stars. For all practical purposes, nuclear fusion and nuclear fission are exact opposites.