

Editorial

Our Sun

The sun rises in the east and sets in the west. The sun revolves round the earth. It is a homogenous hot gas ball without any special property. But it is not correct. In the history of mankind, humans have misled about the sun. They must learn a lot about the sun. The learning about the sun goes on and on. The sun in the centre of our solar system is shining very brightly but many of its secrets remain in the darkness.

The well-known enigma is the heat of the corona. At the visible surface of the sun if it is 6000 K hot one can guess that it is towards outside always cooler. But the case is just the opposite. In the corona with which the sun grows in the vacuum of the universe the temperature lies at 1 million K more.

As the Sun was generated approximately before 4.6 Mrd years, the universe is already 9.2 Mrd of years old. One makes up that stars like the Sun approximately 9 Mrd years long undergoes fusions of stable hydrogen to the helium. If that is correct it would be now half life.

The materials of our solar system were originally a gas and dust cloud, which were gradually dumped in the centre of its gravitation, of today's sun. More than 99.86% of the mass in the solar system is concentrated in the sun, only 0.14% planted to the planets and moons.

How far is the Sun?

The distance from the earth amounts to an astronomical unit, or 150 million Km or 499 light seconds. From the centre of milky-way it is 29000 light seconds far apart. These are stars with 200 times the mass of the sun hyper-gigantic, however, there are similar with 1/13 of the sun's mass (red dwarfs). The red dwarf's amount to three-fourth of all stars. The sun's radius, 695000 Km corresponds to 109 times that of the earth's radius. In comparison: Had the earth changed

to sun's centre, and then the moon would have rotated always within the sun.

While the sun is comparatively young, it has at its disposal relatively many heavy elements. In the astrophysics the talk is about metal content whereby here everything as metal defined which is heavier than helium, therefore as for example also oxygen and carbon. That in the fusion process such atoms are not generated, the heavier atoms might have come from elsewhere. It is to be thought that these are the residue of earlier Supernova.

Where from we know, what we about the sun know?

Space probes and terrestrial observatories watch over the sun for decades. A problem however is hardly to be solved. Through the temperature dependent big distance to measuring instrument become before all phenomena on big scale visible. What happens a small scale remains hidden. Hardi Peter, researcher at the Max-Planck Institute for Solar System Research in Göttingen, names as for example, out of the research of magnet field, "We observe Sun's spots bigger than the earth but the scattering dispersion length lay in the extent of few centimeters.

What happens in the interior of the Sun?

Hydrogen cores undergo fusion to helium. To be precise, per second out of 600 million tons of hydrogen, 596 million tons of helium is generated. The residual 4 million tons are converted to energy and radiated. According to Einstein's equation $E = mc^2$, goes upto 3.9×10^{26} J, therefore accumulated to primary energy consumption of Germany to take a course of 32 million years. The sun is in power equilibrium. The gravitation acts against the radiation pressure of hot materials.

What will happen with the sun in future?

In course of 100 million years the sun will be about

1% brighter. That means some time – perhaps in 600 million years it will be so hot on earth that water will evaporate, most probably for us it will be extremely hot.

The reason for that: Always more and more hydrogen undergo fusion to helium through which materials will settle from outside inwards, a portion of the potential energy will be transformed to heat energy, so that the fusion process will accelerate and certainly always more extensive till the sun dies.

How will it end once with the sun?

Whenever hydrogen in the core of the sun is fully utilized, the sun will be then a helium sphere wherein first no further fusion process occurs. The radiation pressure is exhausted and the core is contracted. In consequence the interior becomes so hot that in hydrogen rich mantle around the core fusion newly begins. During this the core contracts further, the sun expands – now a huge red-giant, till it reaches upto the today's earth's orbit.

Whenever the heat in the core becomes so enormous, 100 million K that one so-called helium flash of helium explosion like undergoes fusion in carbon. If no more helium is available, the core shrinks. As already with hydrogen, now the remaining helium in a shell round the core. The remaining gas becomes always compressed further apart from the core, during which the core always strongly contracts.

For further fusion process the mass is not sufficient. Finally our sun becomes a white dwarf an ultra-dense formation of carbon and oxygen, not bigger than our earth transformed to Nebula of scattered remains of the old star.

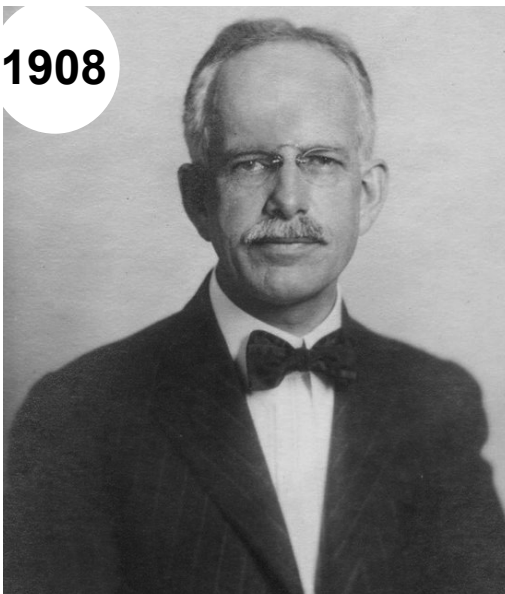
1843



Samuel Heinrich Schwabe, was a General Astronomer and Botanist.

In 1843 he discovered that the sun follows an 11 yearly cycle.

1908



George Ellery Hale, a US Astronomer discovered about Zeeman-Effect, the magnetic source of sun's spots.

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