Tuesday, July 31, 2018

Space mission 2018.

The solar wind.

Parker solar probe.

Solar orbiter.

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+ 1

In astronomy.

The big problems I'm going to refer in this post are:

The solar wind, its acceleration, its heating.

The solar wind.

Extention of the solar corona, which, being very hot, is not in thermal equilibrium, it expands around the sun between 200 to 800 km-s

Its terminal velocity at Earth's orbit beyond the solar wind is proportional to temperature-thermal energy (inside the crown)

Relation = the warmer the crown, the higher the thermal energy, the greater the kinetic (final) velocity.

To date, the wind speed between 200 & 400km-s is very well explained.

But there is no current theory for the fast wind (800Km-s) emitted by the

sun's poles, and, for which, the temperature in the emission regions is too low.

Relation = lack of energy = search for energy to add to the system to explain the fast wind (problem 1)

Solar wind temperature (problem 2)

When the temperature of the solar wind is flowing, it is possible to measure the temperature of the medium (by space probes)

Relationship: the temperature does not decrease radiabatically = system with no energy exchange with the outside = search for this source of energy in the plasma.

The coronal plasma is not directly observed.

The solar corona is much hotter than the surface.

We still do not know by what reaction it is heated.

Idea = the physics that explains this could be responsible for the solar wind acceleration.

We will try to get closer to it, to perform measurements in situ *

Relation = observation from the earth of the photons emitted by the corona = spectroscopy = analysis of the light emitted by the sun = idea of the state of the plasma in the corona.

Parker Solar probe + 1

Relation = approach of the crown to directly measure the plasma-the particles constituted mainly ionized hydrogen = measurement of the function of distribution of the velocities-the electromagnetic fields created by these particles = research of the mechanism of acceleration-heating of the wind solar and crown.

This mission is very old (its concept) dates from 1958, among various

(pre) missions (pre recommended by the Simpson's committee to NASA) as the exploration of Mars, Venus, the moon, and there was among these missions, a mission to explore the solar corona.

Understanding the solar wind goes through understanding the crown.

All the missions were carried out except this one, lack of technological means mainly.

Relation = Mission requiring technological means to realize the heat shield located in front of a probe = protection preventing the probe from burning.

Probe sent at a very high speed by the largest Delta IV Heavy rocket (Delta 9250H) from Cape Canaveral.

A second engine will be lit for given a speed being the most important that can reach an object built by the human.

The probe will go towards Venus..

The probe will pass next to Venus to take advantage of its gravitational assistance to get the Sun.

The first pass (presumed) closer to the sun will take place (if nothing changes) on November 1, 2018, at 37 rays of the Sun.

The probe will, afterwards come back.

During the mission she will take advantage of other gravitational audiences of Venus, the goal being to bring closer the solar corona.

Solar orbiter (February 2020)

Mission of the European Space Agency which will study the sun (the crown) by combining In situ * measurements with distance measurements (imagery + In situ * measurements) combining these measurements with that of Parker solar probe which will be already in orbit since about 2 years.

The probe including telescopes + In situ measurements * respecting the distance limit required (1-3 of astronomical unit) to limit the passage of photons.

Solar orbiter will approach only one third of astronomical unit maximum of the solar corona (about 60 solar rays)

The temperature of the crown being a major problem of this mission for solar probes.

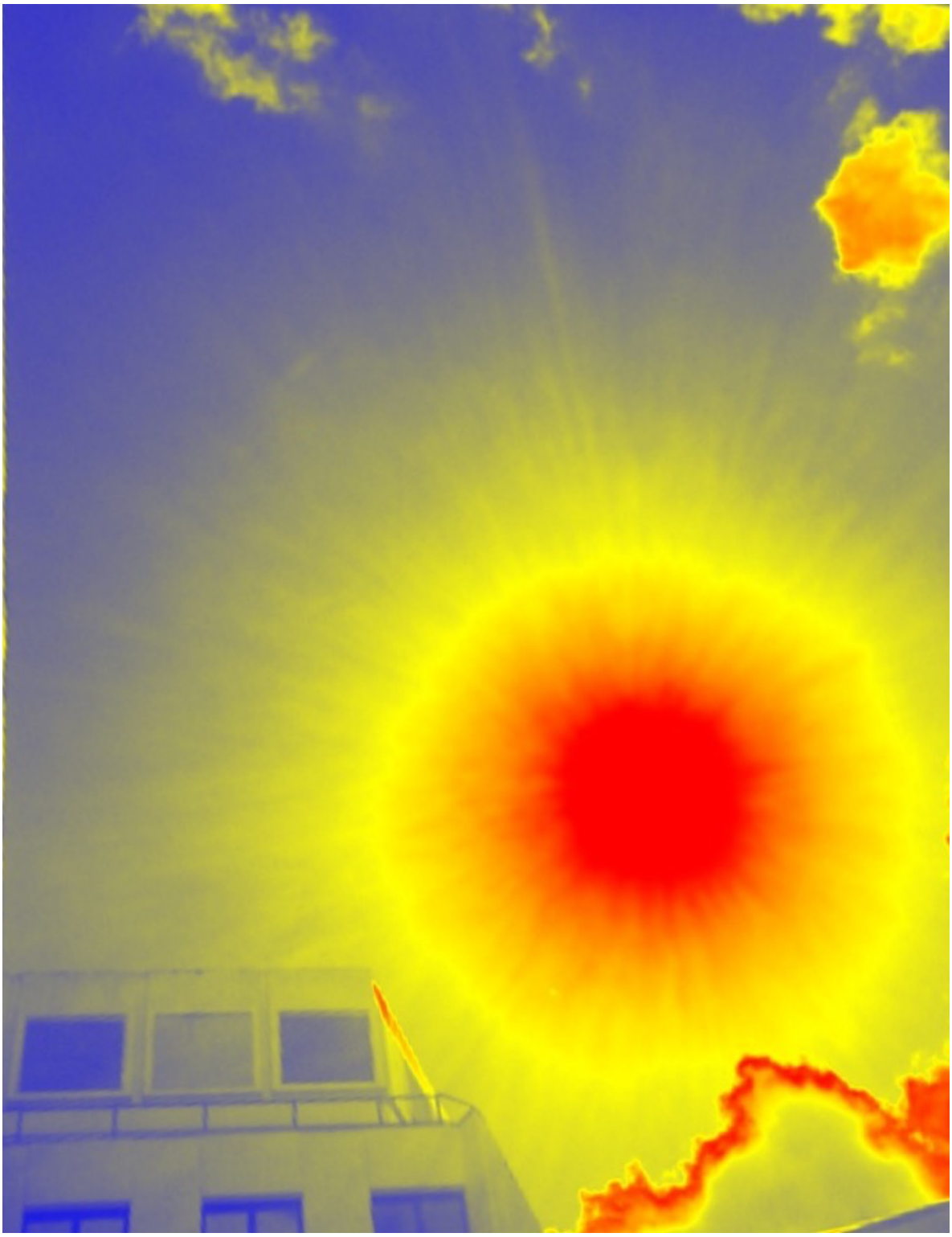
With Parker solar probe, the probe will be permanently pointed towards the Sun.

Relation = Hot star = emission of heat in the form of photons = light = increase of the equilibrium temperature of the body which approaches the sun by the photons.

Once the approach distance reaching 10 solar rays is reached, the number of photons will be equal to the distance ratio squared (ratio 20 squared-on 1 astronomical unit = 400 times more photons)

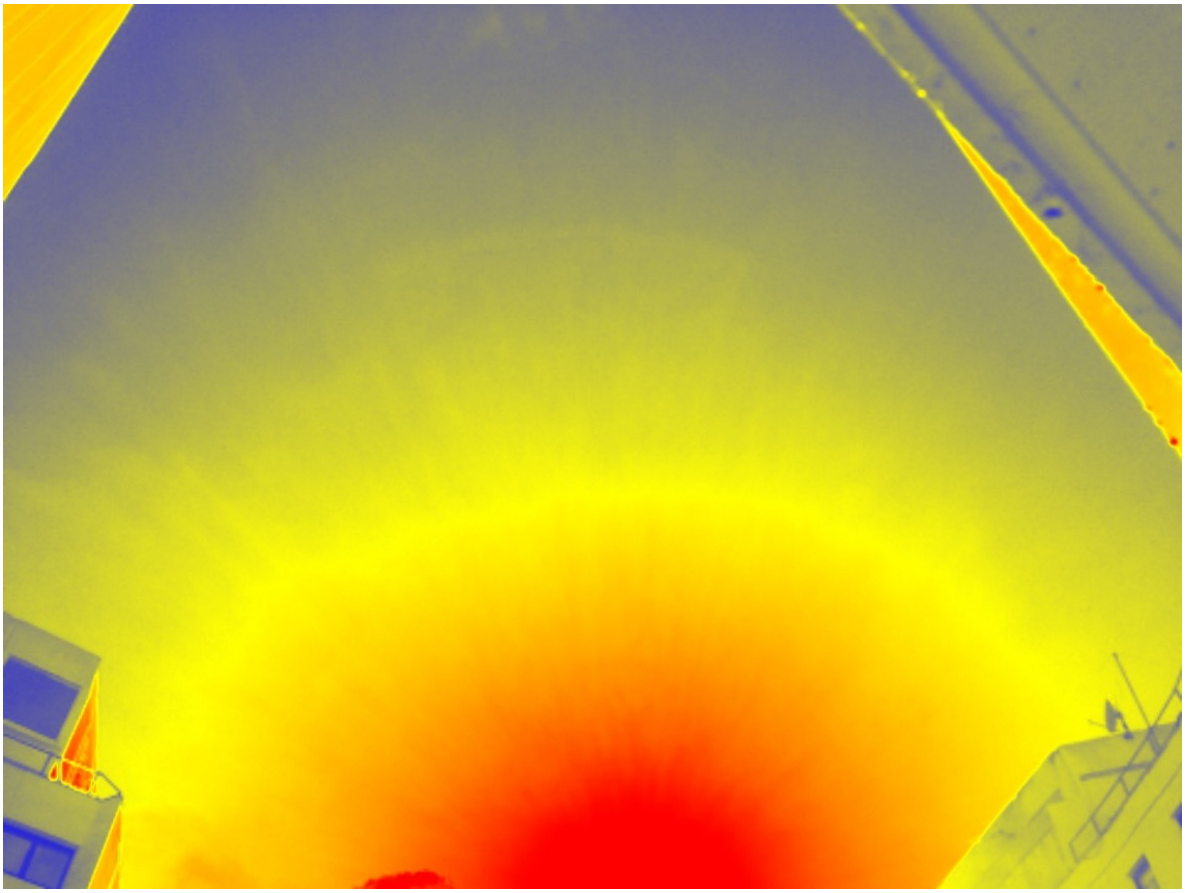
1 astronomical unit is equal to 215 solar rays.

The temperature at Earth's orbit is equal to (about) 300 Kelvins or 26.85 degrees Celsius.



1

At the distance quoted from 10 solar rays, it is of the order of 1773,15 to 2273,15 Kelvins is 1500 to 2000 degrees Celsius



2

Electronics do not work at this temperature to be maintained between -60 to + 90 degrees Celsius.

All satellites to be maintained at this temperature by side radiators.

The shield of this mission will recover all the solar energy and will erase this energy on the side now the probe at a temperature below 100 degrees Celsius.

The shield of the Parker solar probe mission consists of carbon and titanium.

Solar orbiter shield is a little different, but in both cases the shields are designed to withstand high temperatures without fonts or deformations.

Communication will be interrupted when the probe is closer to the sun

(problem 3) because of the crown.

The density of the plasma and the temperature prevent / disturb the radio signals sent by the communication antenna (sort of black out)

The probe will be, at that moment behind the Sun the live communication will then be impossible (to receive the data as to pilot)

Everything is calculated and planned so that the probe goes into completely autonomous mode during this phase, it will have to store the data on board on a mass memory (flash memory) in order to transmit them when it goes away from the Sun.

E. Parker is the first plasma physicist to have proposed a theoretical model to explain a supersonic wind and to have predicted the Parker spiral (shape of the interplanetary magnetic field)

Wind for which the flow velocity of the plasma is greater than the speed of sound, the thermal velocity in the plasma.

The solar wind produces a supersonic flow = many consequences.

Internship:

M.Maksimovic, Astronomer, Observatoire de Paris and specialist in the solar wind.

Observatory of Paris-U.F.E

The solar wind , June 13.

Parker Solar Probe is on the firing point at Cape Canaveral: The launch is scheduled for August 6, 2018, between 4am and 5am local time.
PSP-FIELDS scientific team at LESIA.

Milan Maksimovic (Lead Co-I), Michel Moncuquet (Co-I), Nicole Meyer-Vernet (Co-I), Karine Issautier (Associate Scientist)

LESIA is also involved in the PSP mission as a whole: Olga Alexandrova, Carine Briand, Lorenzo Matteini, Filippo Pantellini and Arnaud Zaslavsky.

- **Sun: crown**
- **Sensitive test for ion-cyclotron resonant heating in the solar wind**
- **Magnetic reconnection, acceleration and particle transport**
- **Solar wind and interplanetary medium**
- **Thunderstorms of Type III: the contributions of ISEE-3**
- **Coupling of waves in the interplanetary medium**
- **Large scale structure of the solar wind**
- **Unique measurements in the tail of a comet**
- **Solar radio astronomy**
- **Space radio astronomy: spectroscopy of thermal noise**
- **3D Radio Mapping on ISEE3 / ICE**
- **RPWS / HFR, methodology**
- **Electromagnetic Sensors Study for EJSM / Laplace**
- **Spectroscopy of quasi-thermal noise**
- **Earth and planetary magnetospheres**

I am excited to write the title and this blog post and display my 100% Internship result on heliosismology tests.

Posted by Veronica IN DREAM at 11:19 PM