DAN SEATON ☀ LAUREL RACHMELER
ROYAL OBSERVATORY OF BELGIUM

STUDYING THE SUN WITH SATELLITES

dseaton@oma.be ☀ laurel@oma.be

THE SUN

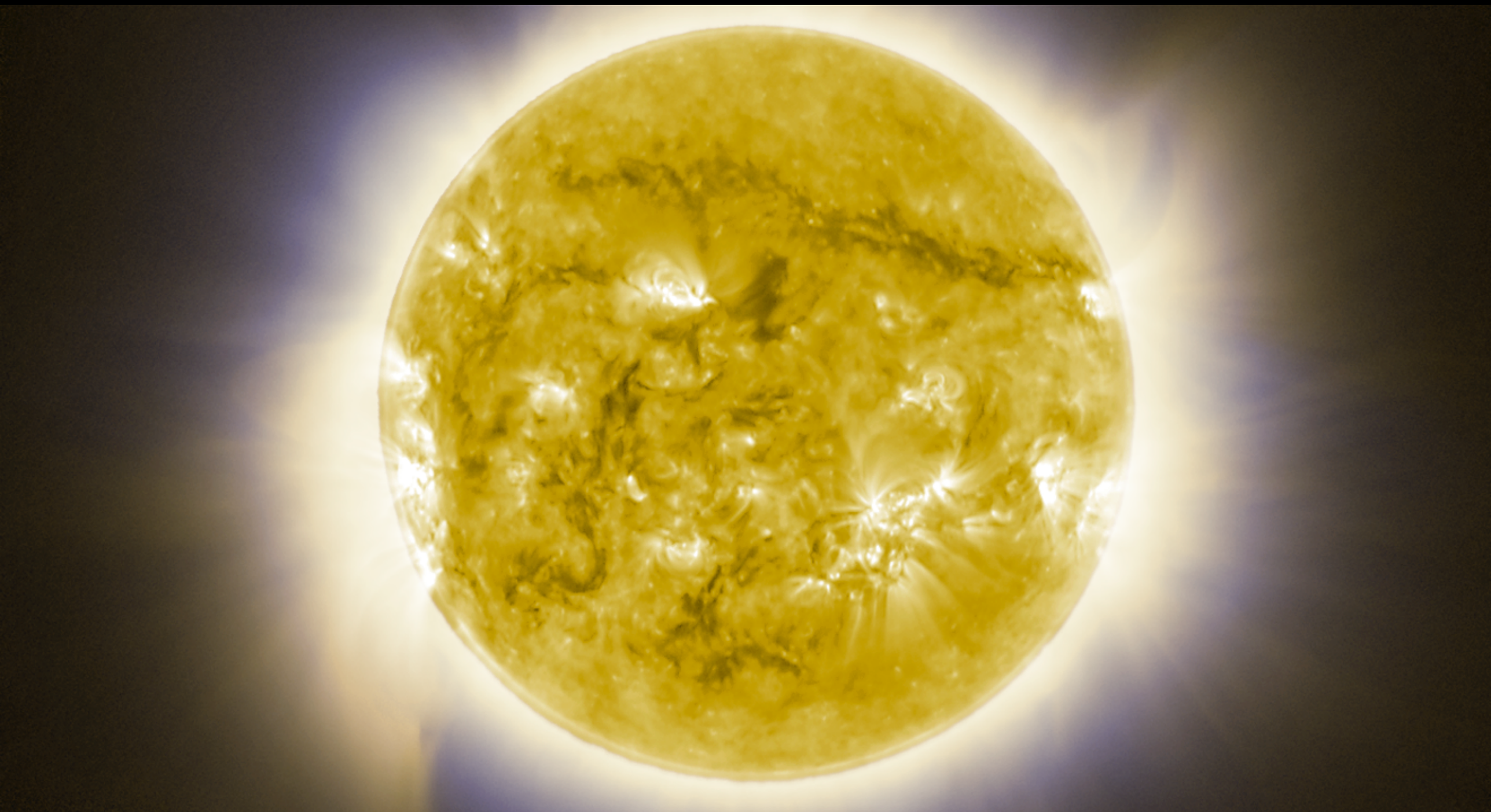
When you think of the sun, you probably think of the bright, featureless ball you see in the sky.

THE SUN

And you probably know the sun provides the light and heat that makes life on Earth possible.

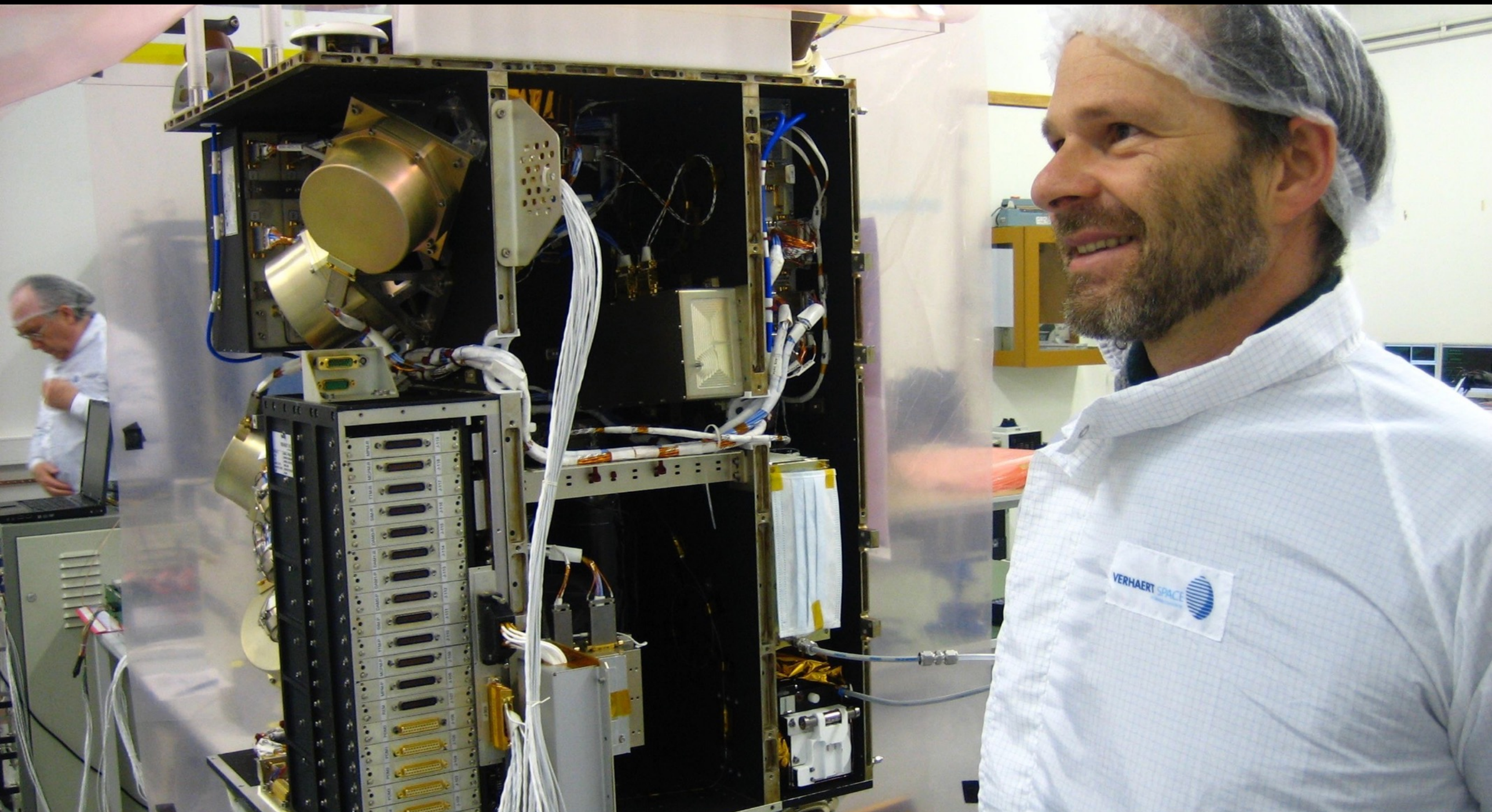
THE SUN

But the sun has a hidden side you can’t see with your eyes at all. That’s why we need to use PROBA2.



PROBA2

PROBA2 was built by scientists and engineers in a special lab in Belgium.



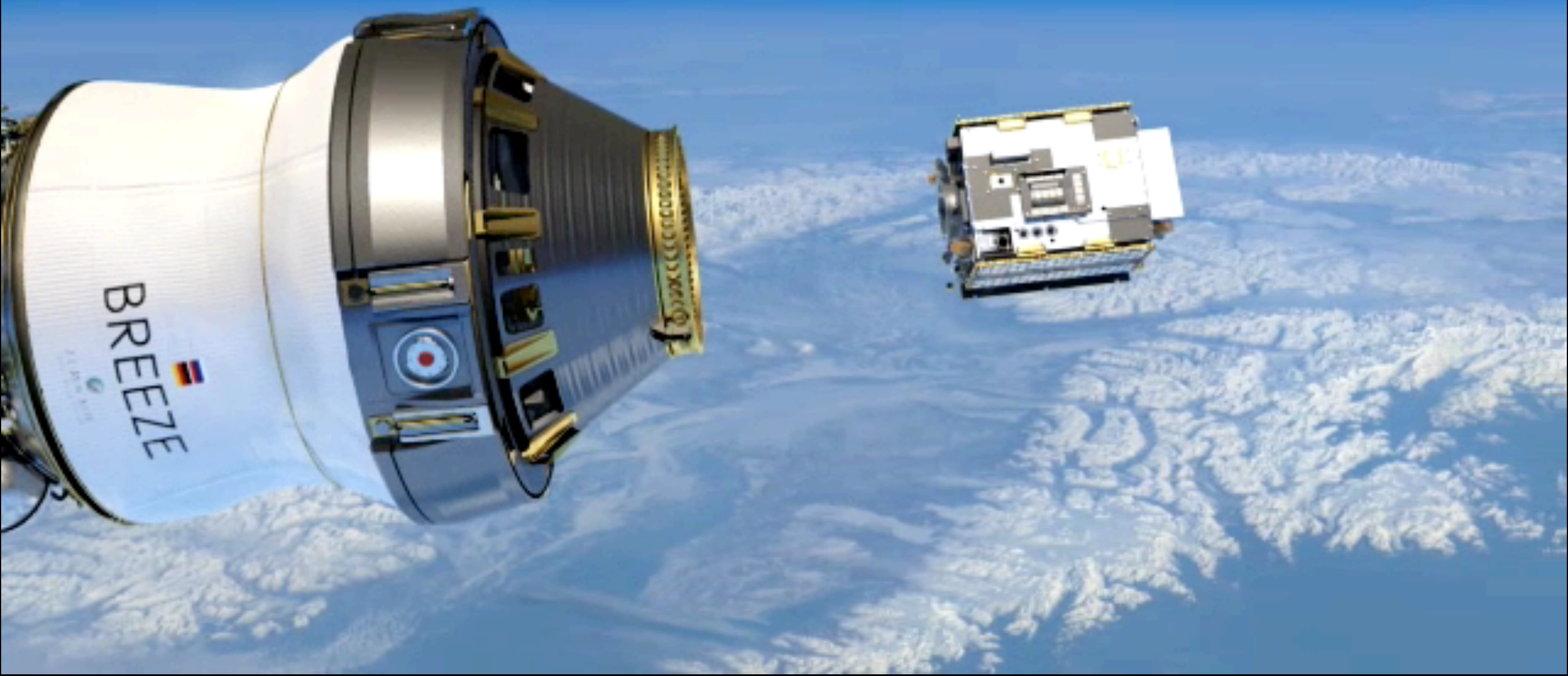
PROBA2

In November 2008, PROBA2 was launched using a rocket in snowy, cold Siberia, a place in northern Russia.

PROBA2

After about three hours, PROBA2 reached its orbit around the Earth, 450 miles high.

Watch the movie



PROBA2

We use a camera called SWAP to take pictures of the sun with PROBA2.

SUNLIGHT

When we look at the sun in the visible light we see with our eyes, it looks like a yellowish ball.

SUNLIGHT

Remember *never* to look at the sun directly, it can damage your eyes!!! We used special equipment to take this picture.

SUNLIGHT

Sunlight is made of many colors. You can see some of these colors when you see a rainbow.

SUNLIGHT

You can use a prism to break up sunlight into its colors as well. But much light from the sun is invisible to our eyes.

SUNLIGHT

When we use satellites to look at the sun in ultraviolet light or x-rays, we see a very different picture.

SUNLIGHT

Just as we see the body
one way in a picture
taken in normal light...

SUNLIGHT

…and another way in a picture taken using x-rays.

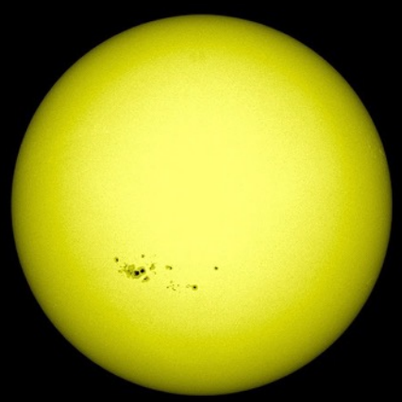
The same is true for the sun.

THE SUN FROM SPACE

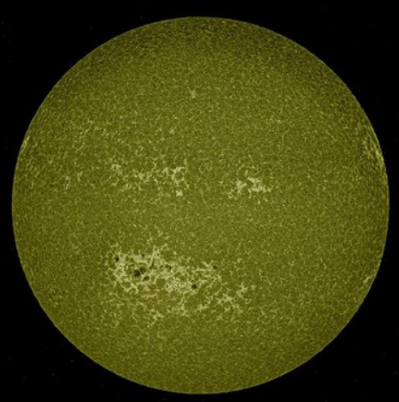
This is what the sun looks like in the camera on our satellite, which sees ultraviolet light.

THE SUN FROM SPACE

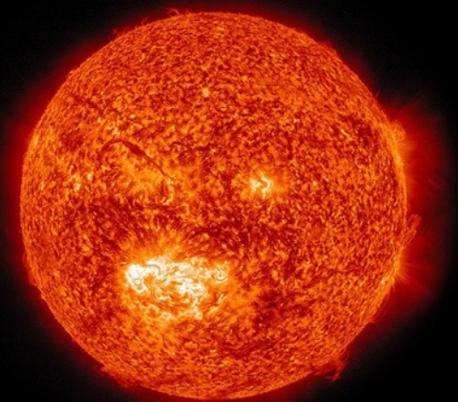
Other satellites take pictures in different kinds of light to see the Sun in different ways.



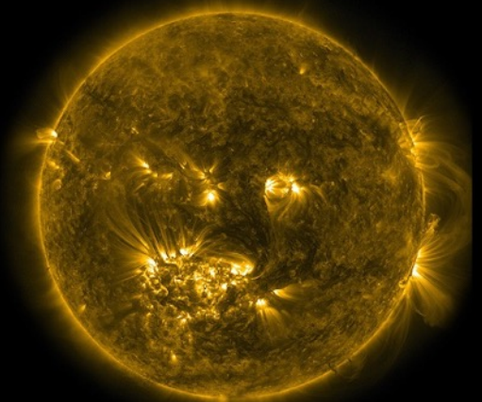
AIA 4500 Å
6000 Kelvin
Photosphere



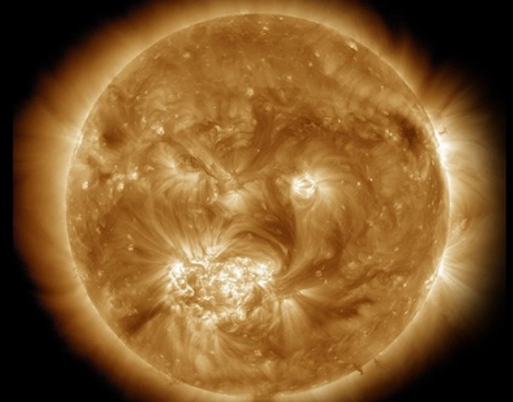
AIA 1600 Å
10,000 Kelvin
Upper photosphere/
Transition region



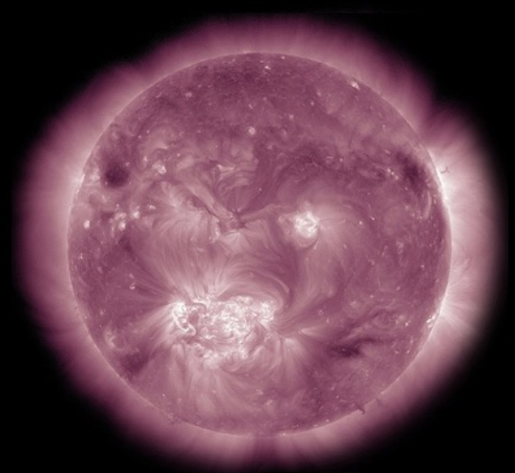
AIA 304 Å
50,000 Kelvin
Transition region/
Chromosphere



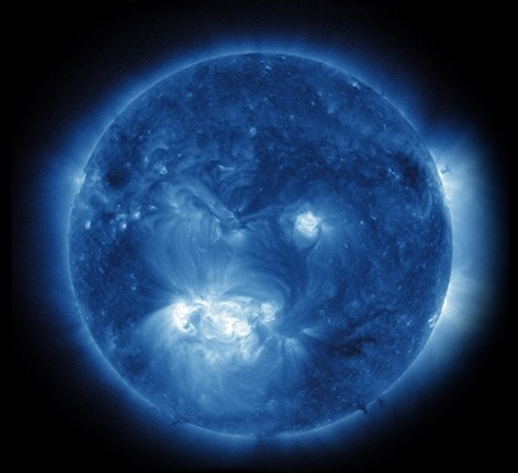
AIA 171 Å
600,000 Kelvin
Upper transition
Region/quiet corona



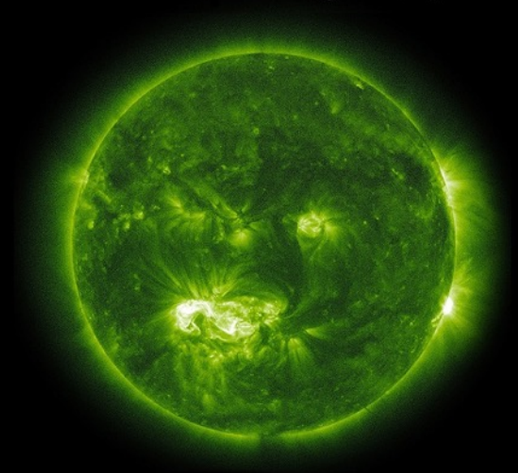
AIA 193 Å
1 million Kelvin
Corona/flare plasma



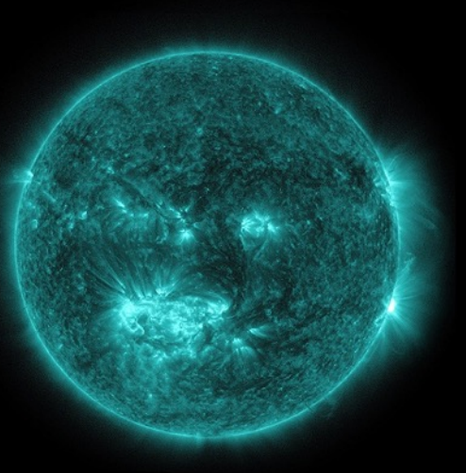
AIA 211 Å
2 million Kelvin
Active regions



AIA 335 Å
2.5 million Kelvin
Active regions



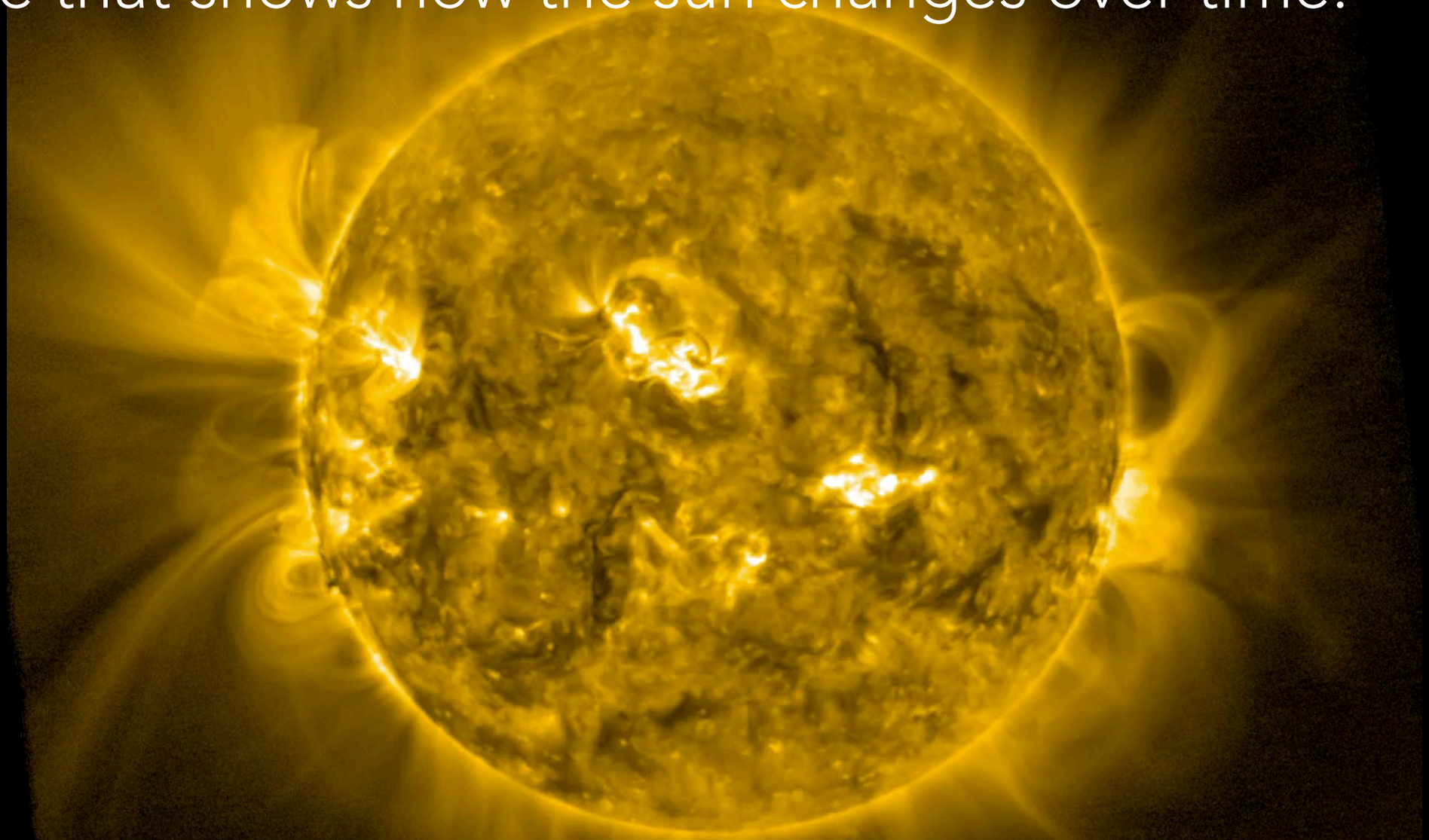
AIA 094 Å
6 million Kelvin
Flaring regions



AIA 131 Å
10 million Kelvin
Flaring regions

THE SUN FROM SPACE

When we take a lot of pictures, we can make them into a movie that shows how the sun changes over time.



Watch the movie

THE SUN FROM SPACE

Sometimes we see the moon go in front of the sun: this is a solar eclipse.

Watch the movie

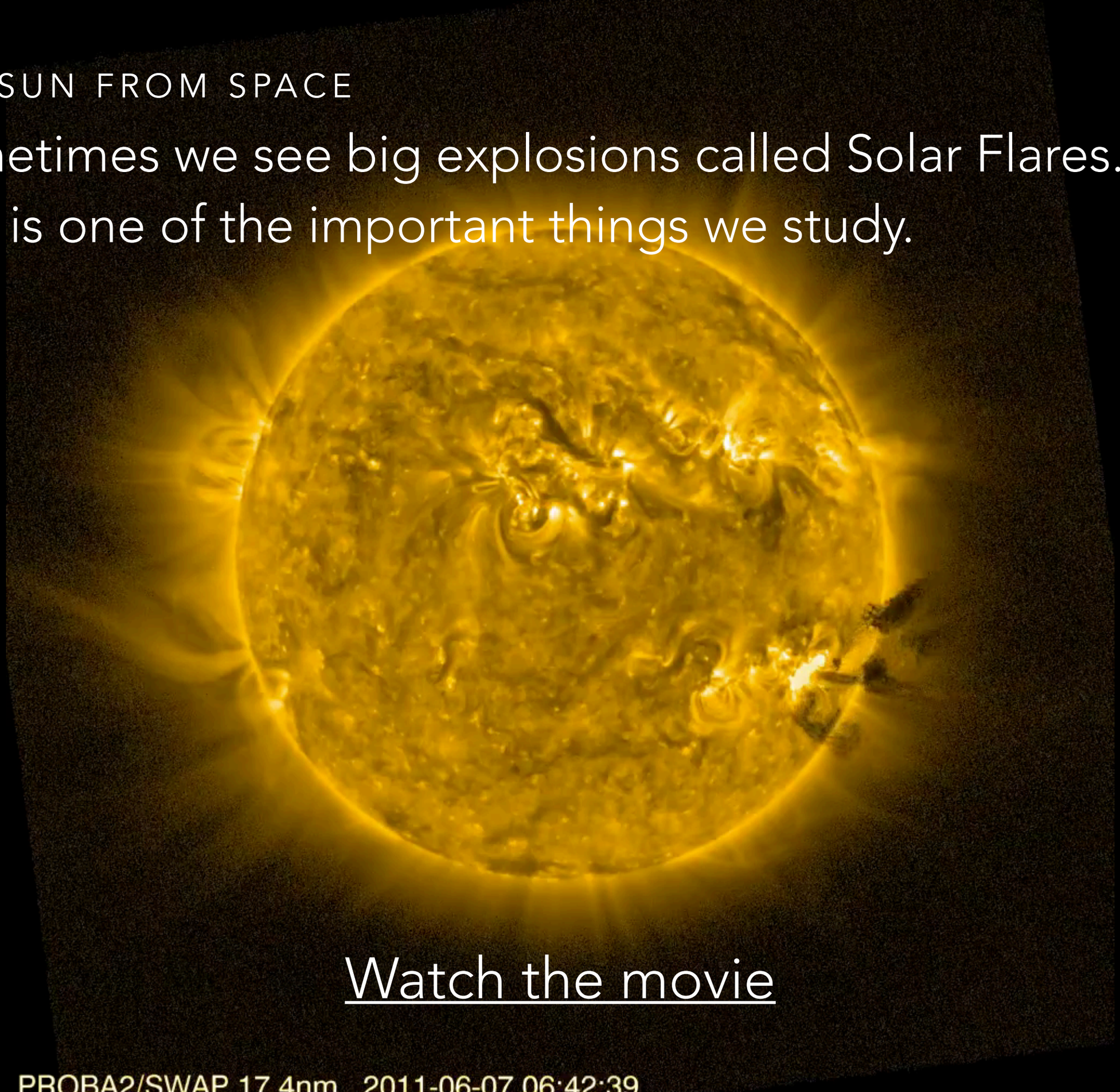
THE SUN FROM SPACE

In 2012 we saw the planet Venus go in front of the sun.
There is a word for this too! It's called a transit.

Watch the movie

THE SUN FROM SPACE

Sometimes we see big explosions called Solar Flares.
This is one of the important things we study.



Watch the movie

Watch the movie

Thanks for listening!