

How can extreme temperatures affect spacecraft? NASA is about to have the answer

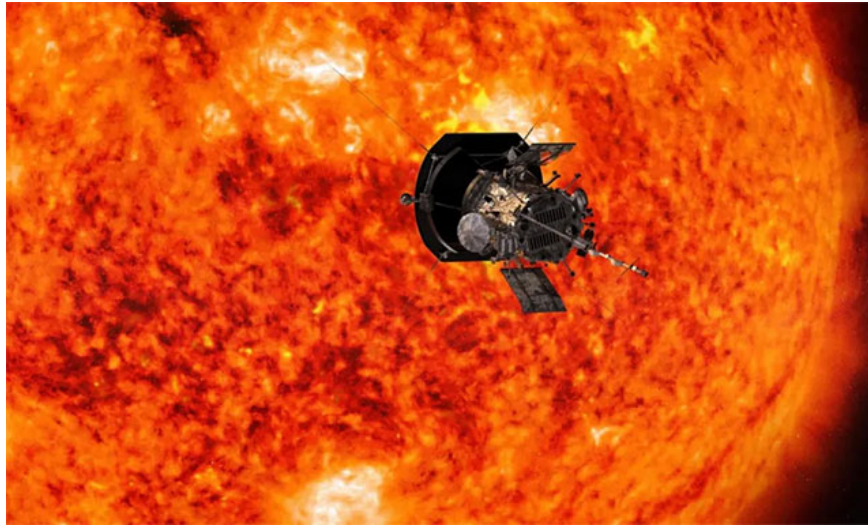
The Parker Solar Probe is currently on its way to a destination just 3.8 million miles (about 6.1 million kilometers) from the Sun's surface, literally immersed in the star's outer atmosphere—also known as the corona.

We all know the importance of preventing electronic devices from overheating while in use, but nothing compares to the extremely hot working conditions that NASA's Parker Solar Probe is about to endure as it makes its closest ever flyby to the Sun.

Launched in 2018, the spacecraft has flown past our host star 21 times. With each approach, Parker Solar Probe gets closer to the center of the solar system, aiming to discover why the Sun's atmosphere appears to be even hotter than the surface. Scientists also hope the data will help them better understand the solar wind, the stream of particles that collide with Earth's magnetic field, creating beautiful auroras but sometimes causing problems with power grids and communications systems on Earth.

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If you think 6.1 million kilometers doesn't sound too close, consider this: Earth is 93 million miles (150 million km) from the Sun. That means the Parker spacecraft will be 24 times closer to the Sun than we are, battling extreme radiation and temperatures of 1,400°C (2,552°F). With such a narrow margin of error, NASA scientists will have to hold their breath to find out if the probe survived the solar ordeal. Results will be available after December 27—when communications signals are expected to be returned to Earth—to see if it's still working.



The Parker spacecraft—named after Dr. Eugene N. Parker, a pioneer in solar research—will travel at a blistering speed of 430,000 mph (692,000 km/h). This means it will enter and exit the Sun's corona as quickly as possible, minimizing exposure to harsh conditions while still having enough time to use its four sets of instruments to collect data about the star.

If successful, Parker will set a record for being the probe that will fly seven times closer to the Sun than any spacecraft in the past, is expected to travel faster than any previous man-made object and is our first attempt to enter the star's corona. Speaking to the BBC, NASA's Chief Scientist Dr Nicola Fox said the probe is "a tough, tiny spacecraft" that is "designed to withstand all these harsh, extreme conditions".

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