

PARKER SOLAR PROBE

National Aeronautics and
Space Administration



THE MISSION

Humanity's First Mission to Touch the Sun

Parker Solar Probe will fly directly into the Sun's corona, facing extreme temperatures while sampling particles and measuring electric and magnetic fields.

Named after Dr. Eugene N. Parker, who predicted the solar wind, the spacecraft will provide data critical to answering key outstanding questions in solar physics: The coronal heating problem, the origins of the solar wind, and the acceleration of solar energetic particles.

SCIENCE QUESTIONS

The Coronal Heating Problem

The Sun's outermost layer, the corona, is over 300 times hotter than the surface layer below it. That's like walking away from a fire – and feeling the temperature rise!

One theory views waves as the source of heating; another, proposed by Dr. Parker himself, attributes it to many small explosions called nanoflares. Parker Solar Probe will fly into the corona to collect critical data and help solve this enduring puzzle of solar science.

The Origins of the Solar Wind

The solar wind is a stream of charged particles that flow continuously out from the Sun in all directions at speeds of up to 1 million miles per hour. But how do these particles escape the Sun and get moving so fast?

Parker Solar Probe will sample the particles and electrical and magnetic fields at the source of the solar wind to understand their origins and acceleration in unprecedented detail.

Solar Energetic Particles

Even the fastest solar wind is no match for solar energetic particle events – bursts of protons and electrons that can make it to Earth in under one hour. Scientists believe they are driven by solar flares and coronal mass ejections, but the detailed physics remains unknown. Parker Solar Probe will measure solar energetic particles right at their source regions to determine their acceleration and transport mechanisms.

SOLAR WIND

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The heat shield, made of a 4.5 inch carbon foam, will reach temperatures of 2,500 degrees Fahrenheit.

Corona (THE SUN'S OUTER ATMOSPHERE)

Parker Solar Probe will use seven Venus flybys over nearly seven years, relying on the gravity of Earth's sister planet to shrink its oval-shaped orbit around the Sun.

Mercury

Sun

Venus

Earth

LAUNCH

Parker Solar Probe will reach within 3.83 million miles of the solar surface.

For more information, please visit: nasa.gov/sunearth