Parker Solar Probe sees Venus orbital dust ring in first complete view
18 April 2021, by Sarah Frazier

In order to see the solar wind with WISPR, scientists use image processing to remove the dust background and stars from the images. This process worked so well that Venus' orbital dust ring—which appears as a bright band stretching across the images—was subtracted as well. It wasn't until Parker Solar Probe performed rolling maneuvers to manage its momentum on its way to its next solar flyby, which changed the orientation of its cameras, that the static dust ring was noticed by scientists. Based on the relative brightness, scientists estimate that the dust along Venus' orbit is about 10% more dense than in neighboring regions. The results were published on April 7, 2021, in *The Astrophysical Journal*.

The German-American Helios spacecraft and NASA's STEREO mission—short for Solar Terrestrial Relations Observatory—have both made earlier observations of the dust ring along Venus' orbit. Those measurements have allowed scientists to develop new models of the origins of dust along Venus' orbit. Parker Solar Probe's sensitive imagers and unique orbit have given scientists an unprecedented peek at Venus' dust ring—something the science team aimed for since the mission's early days.

As Parker Solar Probe flies ever-closer to the Sun over the course of its mission, the science team also expects to make the first observations of a long-hypothesized dust-free zone, a region close to the Sun where dust has been heated and vaporized by the intense sunlight. If there is a dust-free zone near the Sun—an idea supported by regions of thinning dust that Parker Solar Probe has already observed from afar—this would not only confirm theories about the interaction between our star and its nearby dust, but could also help astrophysicists who study more distant objects: Just as space dust can interfere with seeing the solar wind, it can also muddle measurements of stars and galaxies.

However, for many scientists, the dust itself is...
what's interesting. For example, the exact origins of the dust that fills the solar system isn't settled science. For decades, scientists have largely thought the dust is debris from comets and asteroids—but new research using data from NASA's Juno mission to Jupiter suggests that dust storms on Mars could be the source of much of the solar system's dust.

Space dust may also form the building blocks of stars and planets, carry gases between star systems, and provide a nurturing environment for young planets. These were some of the questions in mind for scientists on the DUST sounding rocket mission—short for Determining Unknown yet Significant Traits—which launched in 2019 to investigate how dust grains coagulate in the microgravity of space.


Provided by NASA