Venus' Atmosphere Sends Radio Message During Parker Solar Probe's 3rd Flyby

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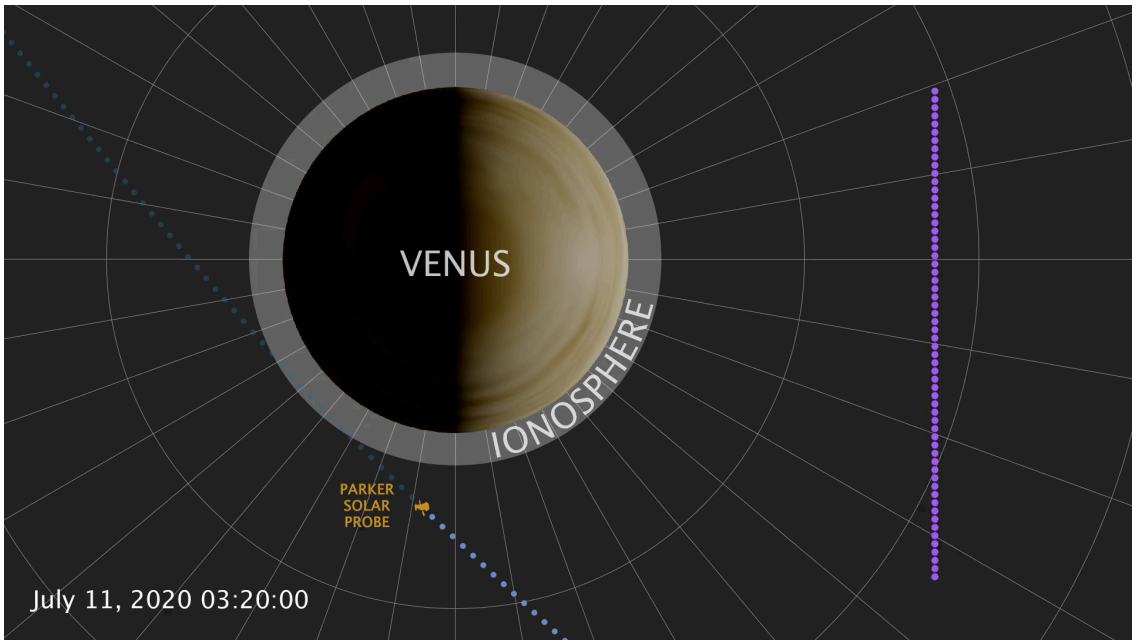
In July 2020 Parker Solar Probe made its 3rd (and closest yet) flyby of Venus (517 miles altitude). **For 7 minutes around closest approach the PSP FIELDS instrument discovered a natural radio signal that revealed the spacecraft entered the planet's ionosphere!**



This video shows the orbit of Parker Solar Probe as it entered Venus' ionosphere. The bars on the right are a representation of the sonified wave forms that change as Parker passes into and out of the ionosphere.

By measuring the frequency of radio emission, it was possible to unambiguously measure the density of the plasma around the spacecraft on its flyby – the first direct measurement of the ionosphere near solar minimum. The last direct measurement was by NASA's Pioneer Venus Orbiter in 1992 (near solar maximum). Funded through the NASA ROSES Solar System Workings program, **the new measurements shared in this study confirm a substantial (and unexplained) change in the ionosphere over the 11-year solar cycle.**

Understanding how and why Venus' ionosphere thins near solar minimum and how it loses water to space are important outstanding questions needed to solve the mystery of why Venus and Earth evolved so differently. More data is needed to understand Venus' changing ionosphere and escape rates over the solar cycle. Future missions (and PSP flybys) can use upper hybrid waves to cheaply study Venus and its ionosphere.

Glyn A. Collinson (673), Robin Ramstad (Lab for Atmospheric and Space Physics), Alex Glocer (673), Lynn Wilson III (672), Alexandra Brosius (691) (2021a), *"Depleted plasma densities in the ionosphere of Venus near solar minimum from Parker Solar Probe observations of upper hybrid resonance emission"*, Geophysical Research Letters, (accepted)