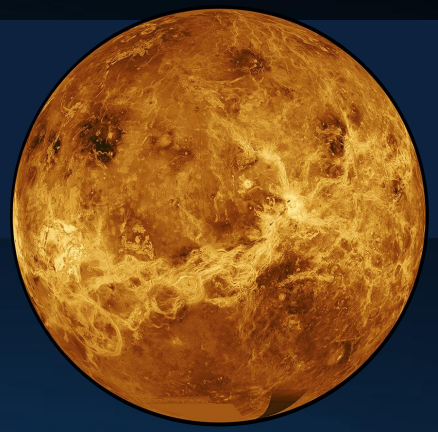

A Fast and Robust Surface Sample Acquisition System for a Venus Lander

JPL and Honeybee Robotics have designed, built and successfully tested a fast end-to-end sample acquisition and transfer system for the surface of Venus.

- This is a very challenging problem given the very hot (470 °C) and high pressure (92 atmosphere) conditions that limit lander lifetime to a few hours.
- A rotary-percussive drill operates under these harsh conditions and penetrates 5 cm into a hard basaltic rock in 15 minutes.
- A pneumatic sample transfer system uses the high-pressure atmosphere to move small particulates created by the drilling into the lander for sample analysis. Two samples are provided, one from the surface and one from the 5 cm depth.
- This technology could be used on a future Venus lander to enable direct surface composition measurements that would greatly advance understanding of the surface and atmospheric-surface interactions.

Drilling tests were performed under Venus conditions in the tall white chamber; pneumatic sample transfer hardware is on the table in the foreground

Hall et al., (2022) *Planetary and Space Science*