

# How long is a day on Venus?



Radar speckle tracking observations with the Goldstone Solar System Radar and the Green Bank Telescope improved the knowledge of the spin axis orientation of Venus by a factor of  $\sim 10$  in each dimension (obliquity  $2.6392 \pm 0.0008$  deg) and enabled a measurement of the spin precession rate ( $44.58 \pm 3.3$  arcsec/y) and moment of inertia ( $0.337 \pm 0.024$ ) as well as an estimate of the size of the core. The spin period of Venus is  $242.0226 \pm 0.0013$  days but exhibits variations of  $>61$  ppm ( $\sim 20$  minutes) due to transfer of atmospheric angular momentum (AAM) to the solid body. The AAM variations are  $\sim 4\%$  and appear to exhibit a diurnal forcing that may be due in part to mountain torques. The existence of stochastic rotational variations (300 m in 30 days) has important implications for future missions.