

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 ~ 10 in each dimension (obliquity 2.6392 ± 0.0008 deg) and enabled a measurement of the spin precession rate (44.58 ± 3.3 arcsec/y) and moment of inertia (0.337 ± 0.024) as well as an estimate of the size of the core. The spin period of Venus is 242.0226 ± 0.0013 days but exhibits variations of >61 ppm (~ 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.