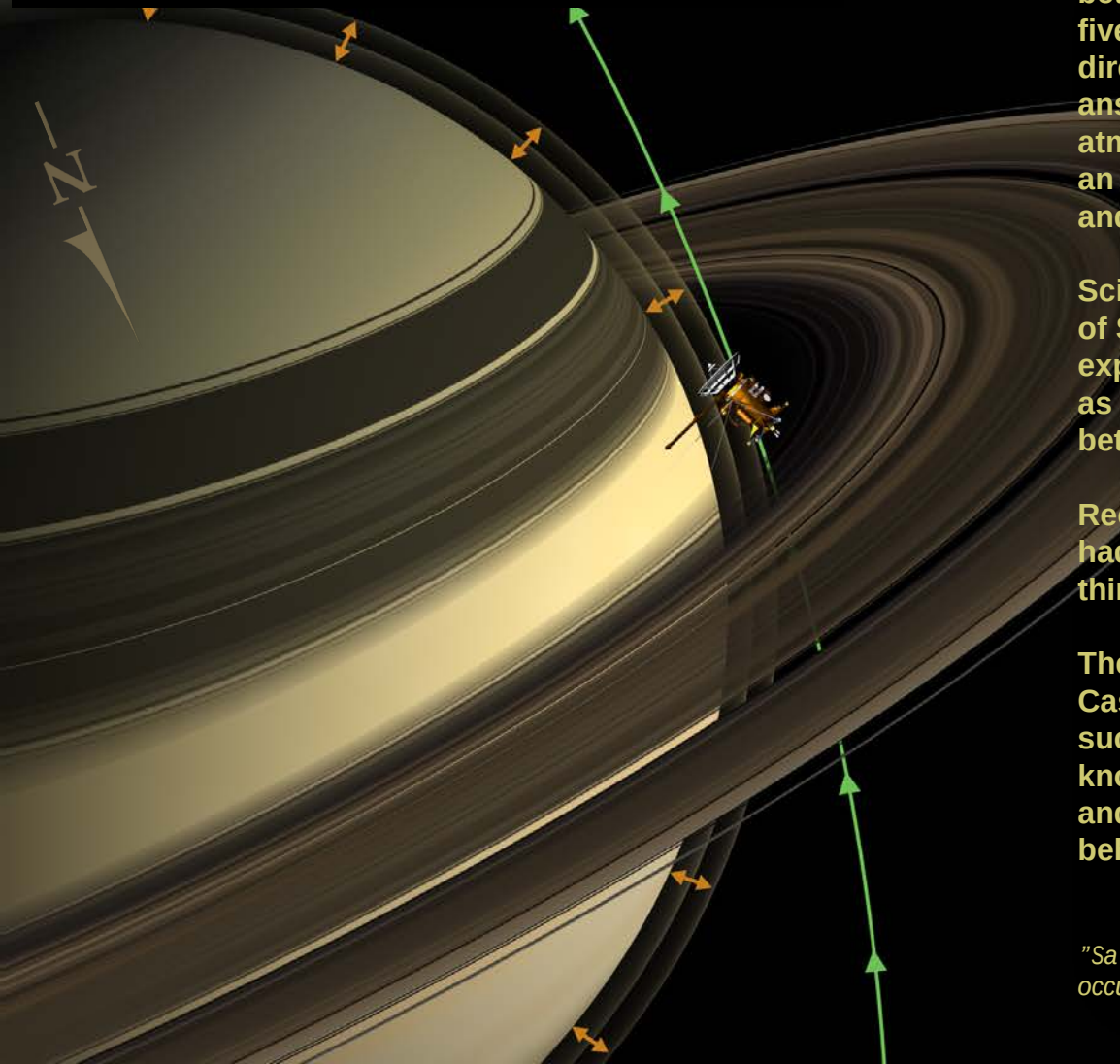
Saturn's Breathing Atmosphere

Saturn's atmosphere has been found to "breathe" as it expands and contracts with seasonal heating and cooling.



Cassini's 2017 Grand Finale Tour will shoot the gap between Saturn's rings and atmosphere. The last five orbits will bring it near enough to Saturn to directly sample the upper atmosphere and help answer why the temperature of Saturn's upper atmosphere is much hotter than can be explained – an unsolved problem also seen at Jupiter, Uranus and Neptune.

Scientists were surprised when stellar occultations of Saturn showed the atmosphere's outer edge had expanded by a whopping 310 miles (500 kilometers) as Saturn's upper atmosphere heated by 180° F between 2005 and 2011.

Recent occultations have shown the atmosphere had contracted again after 2011. Scientists now think that this behavior may be seasonal.

These findings will guide decisions for determining Cassini's safe flight path while allowing for successful atmospheric sampling to improve our knowledge of how atmospheres work. Scientists and engineers will continue to monitor atmospheric behavior as they plan the exciting Grand Finale.

"Saturn's variable thermosphere from Cassini/UVIS occultations", T.T. Koskinen, et al., Icarus, 260, 174-179, 2015.