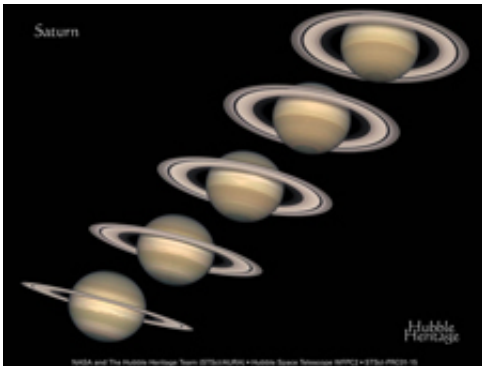


# Saturn to Pull Celestial Houdini on August 11

August 10 2009

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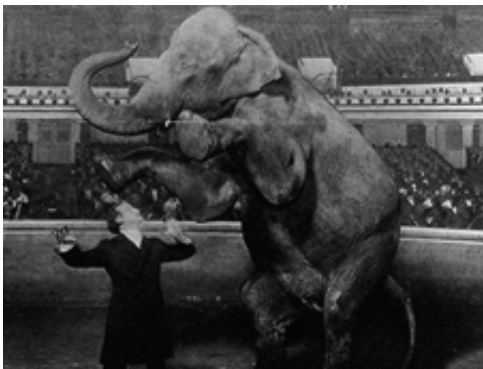


Since Saturn's axis is tilted as it orbits the sun, Saturn has seasons, like those of planet Earth -- but each of Saturn's seasons last for over seven years. The Hubble Space Telescope took the above sequence of images about a year apart. Starting on the left in 1996 and ending on the right in 2000. Image credit: NASA/Hubble

(PhysOrg.com) -- In 1918, magician extraordinaire Harry Houdini created a sensation when he made a 10,000 pound elephant disappear before a mystified audience of over 5,200 at New York's famed Hippodrome theatre. But a vanishing pachyderm is nothing compared to the magnificent illusion to be performed by our solar system's own sixth rock from the sun on Aug. 11. On that day, ladies and gentlemen, boys and girls, children of all ages, the planet Saturn, with no help from either Jupiter or Uranus, will make its 170,000-mile-wide ring system disappear.

How does a mere [gas giant](#) planet, without the benefit of a magic wand, smoke and mirrors, or even sleeves for that matter, manage to hide an estimated 35 trillion-trillion tons of ice, dust and rock fragments? [Saturn](#) itself, perhaps adhering to the magician's code never to reveal how a trick is performed, is not talking. But fortunately for us, dear friends, Linda Spilker, deputy project scientist for the Cassini Saturn mission at NASA's Jet Propulsion Laboratory in Pasadena, Calif., is not in the magician's guild.

"Saturn has been performing the "ring plane crossing" illusion about every 15 years since the rings formed, perhaps as long as 4.5 billion years ago, so by now it is pretty good at it," said Spilker. "The magician's tools required to perform this trick are pure sunlight, a planet that wobbles, and a main ring system that may be almost 200-thousand miles wide, but only 30 feet thick." All [planets](#) in our solar system wobble on their axes to some extent. This change of attitude eventually places a planet's equator directly in line with the photons of light streaming in from the sun. This is called "equinox," and on Earth it occurs every year about March 21 (spring equinox) and September 22 (autumnal equinox). On Saturn, it occurs twice during each 29 Earth-year-long orbit around the sun (about every 15 years).



"Houdini and Jennie, the elephant, performing at the Hippodrome, New York." 1918. *The American Variety Stage: Vaudeville and Popular Entertainment*,

1870-1920, Rare Book and Special Collections Division, Library of Congress.

"Whenever equinox occurs on Saturn, sunlight will hit Saturn's thin rings, the ring plane, edge-on," said Spilker. "The light reflecting off this extremely narrow band is so small that for all intents and purposes the rings simply vanish." While the second largest planet in our solar system has been conjuring its ring plane phenomenon for millennia, the audience for it only began showing up about 400 years ago. By December 1612, Galileo Galilei had been studying Saturn and its "two large moons" (through his primitive telescope he mistook the ring system for moons on either side of the planet) for over two years. He had been noticing these "two moons" getting thinner and thinner. After the rings disappeared from his eyepiece entirely, Galileo shared his surprise in a letter in which he wrote, "I do not know what to say in a case so surprising, so unlooked for and so novel."

"Galileo had every right to be mystified by the rings," said Spilker. "While we know how Saturn pulls off its ring-plane crossing illusion, we are still fascinated and mystified by Saturn's rings, and equinox is a great time for us to learn more." Far from being a loss, a ring plane crossing provides a unique opportunity for scientists. The sunlight hitting the rings at 90-degree angles can illuminate, or throw shadows, revealing ring structures and oddities previously unseen.

But fair warning for those miserly types armed with their own telescopes and determined to get a free celestial magic show. This particular conjuring of the ring-plane crossing illusion will have an audience of one.

"Saturn's orbit has brought it so close to the sun that it is extremely difficult to see even with the best of telescopes," said Spilker.

"Fortunately, we have Cassini in the front row."

The Cassini spacecraft has been observing Saturn, its moons and its rings from orbit around the planet for the past five years. The spacecraft's instruments have discovered new rings, moons, as well as changed the way we look at Saturn's ring system. Around equinox, Cassini's thermal instrument is tasked with measuring the temperature of both sides of the rings as the [sun](#) sets to look at how the rings cool as they go through this seasonal change. The spacecraft's cameras are looking for topographic features in the rings, like tiny moons and possible ring warps, which are only visible at equinox, while the near-infrared and ultraviolet instruments will be on the hunt for signs of seasonal change on the planet.

"The great thing is we are not sure what we will find," said Spilker. "Like any great magician, Saturn never fails to impress." The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The [Cassini](#) orbiter was designed, developed and assembled at JPL. JPL manages the mission for the Science Mission Directorate at NASA Headquarters in Washington.

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