

<p>Astronomers have found One Ring to rule them all, not in the land of Mordor, but around Saturn, the Lord of the Rings of the solar system.</p>	<p><i>One Ring animation fades to Saturn Artist's concept</i></p>
<p>[Titles]</p>	<p><i>Opening titles</i></p>
<p>If you want to come up with a beautiful planet, Saturn certainly pops to mind. It does accessorize better than anything else in the Solar System, something even Galileo realized.</p>	<p><i>[host]</i> <i>Uniview Saturn fly-around backdrop</i></p>
<p>Nearly 400 years ago using his small telescope, he noted Saturn had changing lobes on either side. It would be many decades, however, before astronomers began to understand these to be the ring system we know today.</p>	<p><i>Galileo sketches of Saturn</i></p>
<p>You might say we see Saturn as the Lord of the Rings of the Solar System. In that case, astronomers using NASA's Spitzer Space Telescope have just discovered the One Ring to rule them all.</p>	<p><i>[host]</i> <i>Saturn diagram revealing outer ring backdrop</i></p>
<p>In a patch of sky pretty far out from Saturn itself, Spitzer detected this tell-tale band of infrared light. While the image covers only a small area, it reveals a segment of something much bigger: the largest ring ever seen around Saturn or any other planet.</p>	<p><i>Data image</i></p>
<p>How could such a large ring remain a secret for so long? While it may be huge, the ring is insubstantial. Its diffuse particles are dark and reflect very little visible light.</p>	<p><i>[host]</i></p>

<p>You could compare it to Tolkien’s story of the Lord of the Rings. The Elvish script identifying the One Ring of Sauron only becomes visible when it’s heated in fire. This largest ring of Saturn was only discovered from the glow if its heat in the infrared.</p>	<p><i>One Ring animation</i></p>
<p>To understand this ring’s origin, we have to look beyond Saturn’s family of inner rings and moons to its swarm of outer moons. The largest of these is known as Phoebe. The new ring appears to line up with Phoebe’s orbit, which is significantly offset from Saturn’s ring plane.</p>	<p><i>Animation of Saturn system</i></p>
<p>Phoebe is 220 kilometers across, about 1/15th the size of our own Moon. Its surface is heavily cratered and rather dark in tone. Astronomers theorize that ongoing impacts not only leave craters, but kick off enough dust to create and maintain this outer ring.</p>	<p><i>Cassini images of Phoebe animation of impact</i></p>
<p>These dark dust particles reflect very little of the sun’s visible light, but as they absorb it they heat up slightly. This makes them visible to Spitzer’s infrared sensors, which captured an edge-on view of the ring.</p>	<p><i>[host]</i></p>
<p>So what prompted Dr. Anne Verbiscer and her team to search for an unseen ring here in the first place? The answer can be found elsewhere in the Saturnian system.</p>	<p><i>[host] Animation of Saturn system, highlighting Iapetus orbit</i></p>

<p>The One Ring of Sauron was inherently evil and corrupted all those who touched it. While no one would claim this new ring of Saturn is evil, you could say that its darkness appears to have corrupted Saturn’s mysterious moon Iapetus.</p>	<p><i>One Ring animation cross-fade to Cassini Iapetus image</i></p>
<p>Over 200 years ago, astronomer Giovanni Cassini deduced through careful observation that Iapetus had a strangely dark side. Today NASA’s Cassini mission has shown us in extraordinary detail how almost half of this icy white moon is covered by a unusual dark feature.</p>	<p><i>Historical image of Cassini, cross-fade to Cassini spacecraft</i></p>
<p>The same side of Iapetus always faces Saturn, and its dark side faces into the direction of its orbit. This led astronomers to theorize it must be sweeping up some unseen dark material as it orbits Saturn.</p>	<p><i>[host]</i> <i>Animation of Iapetus as it orbits?</i></p>
<p>It was this material Dr. Verbiscer and her team sought when they found the ring.</p>	<p><i>[host]</i></p>
<p>It’s amazing just how big this ring is. Starting about 6 million kilometers from Saturn, it extends outwards about 12 million more kilometers.</p>	<p><i>Artist’s concept</i></p>
<p>If you could observe it from Earth with infrared vision it would be huge, as wide as two full moons! To paraphrase Tolkien, this is truly one ring to dwarf them all. And its darkness solves a 200 year old mystery about the moon Iapetus.</p>	<p><i>[host]</i> <i>Ring and moon seen in sky</i></p>
<p>For the Spitzer Science Center I’m Dr. Robert Hurt reminding you that there’s a hidden universe just waiting to be discovered.</p>	<p><i>[host]</i></p>