

The Lords of the Rings among centaurs

September 14 2015, by Tomasz Nowakowski



This artist's impression shows how the rings might look from close to the surface of Chariklo. Credit: ESO/L. Calçada/Nick Risinger (skysurvey.org)

(Phys.org)—Chariklo, the largest known centaur object, orbiting in a region between Saturn and Uranus, is a very intriguing celestial body that surprised astronomers [last year](#). This remote minor planet has unveiled the existence of its rings during a stellar occultation, when it passed in front of a star UCAC4 248-108672. Astronomer José Luis Ortiz from

the Institute of Astrophysics of Andalusia in Spain, who was a member of the team that made the discovery, assumes that the ring systems on other minor objects in the solar system could be more common than we think.

"There is the possibility that other centaurs and trans-Neptunian objects (TNOs) might have rings, so it may be too premature to call Chariklo the 'Little Lord of the Rings', as there may be other systems with similar or more remarkable features," Ortiz told *Phys.org*.

Chariklo, about 250 kilometers in diameter, has two rings, one about seven and the other about three kilometers wide, separated by a gap of nine kilometers, at 396 and 405 kilometers from the [minor planet](#). It is the smallest known object to have rings and only the fifth body in the solar system—after the much larger Jupiter, Saturn, Uranus and Neptune—to have this feature.

The discovery was surprising because it had been thought that rings could only be stable around much more massive bodies. Having in mind Chariklo's relative small mass, the rings should disperse over a period of at most a few million years, so the scientists conclude that either they are very young, or they are actively contained by shepherd moons with a mass comparable to that of the rings.

"It was a big surprise. I was expecting that we might detect rings around large trans-Neptunian objects through stellar occultations, and in fact I had mentioned that possibility explicitly in several of my scientific proposals to get funds years before the Chariklo ring discovery, but I was not expecting that a body as small as 250 kilometers in diameter would harbor a ring system," Ortiz said.

"We suspect that shepherd satellites are confining the ring and this can prevent the ring system from dispersing completely. This is our

preferred scenario, but there may be other dynamical mechanisms, too, that could keep creating ring material and could keep the rings from dispersing during the lifetime of Chariklo," he added.

The discovery is promising in terms of future findings of ring systems on small worlds like Chariklo. It is believed that another centaur, named Chiron, also possesses rings circulating around it. But the existence of this feature around Chiron hasn't been confirmed yet. In November 2011, a group of scientists at the Massachusetts Institute of Technology (MIT) observed a [stellar occultation](#) in which Chiron passed in front of a bright star and identified optical features that only suggest this centaur may possess a circulating disc of debris.

"Chiron also possesses at least a partial [ring system](#) and other debris or dust, and particularly, those rings seem to be brighter, with a considerably higher albedo than the rings of Chariklo," Ortiz noted.

According to Ortiz, more observations of centaurs and TNOs are needed with similar techniques as those used for Chariklo, specifically stellar occultations of relatively bright stars using high [time resolution](#) and high-sensitivity instruments. He admits that thus far, we have observed very few objects with the required time resolution and sensitivity to detect rings. The rings of Uranus and the ring arcs around Neptune were found in a similar way during occultations in 1977 and 1984, respectively. So it may soon turn out that Chariklo is not the only "Little Lord of the Rings".

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