Photometric and spectroscopic evidence for a dense ring system around Centaur (10199) Chariklo
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In a recent paper using stellar occultation observations, the presence of two dense rings in the Centaur (10199) Chariklo has been unambiguously shown. The two rings were separated by a small gap and there was a hypothesis that the rings might be composed of water ice as is the case for Saturn's rings and other rings. Here we show that the variability of the spectral ice feature in Chariklo observed in different years and even its disappearance can be explained by the aspect angle of the rings, because the rings were edge-on in 2007–2008. Using XSHOOTER@VLT, we obtained new reflectance spectra and we show that the water-ice spectral feature was again visible in 2013, in accordance with the ring configuration.

We also present new photometric data on the Chariklo system. Here we also show that past absolute photometry of Chariklo from the literature and photometry that we obtained in 2013 can be explained by a ring of particles, with a changing opening angle as a function of time. From the spectral and photometric modeling, we derive properties for the Chariklo surface and ring particles.