



Key words: interstellar comet, asteroid, 'Oumuamua, outgassing

<p>ESOCast Episode 167: VLT sees 'Oumuamua getting a boost</p>	
<p>00:00 [Visual starts] 1. In 2017 astronomers discovered 'Oumuamua: the first interstellar object in our Solar System. Now several telescopes, including ESO's Very Large Telescope, have found that it is leaving our Solar System faster than expected.</p>	
<p>00:22 2. Statement Olivier Hainaut (ESO): The first time we discussed it, we were saying: Oh my god, oh my god. We really need to check and check, and double check and make really sure, because the effect is so small and so subtle that many things could go and screw up your measurements. After checking and double checking, and cross-checking, the effect was still there!</p>	
<p>00:48 [Narrator] 3. But astronomers might have already found an intriguing explanation to this observation.</p>	
<p>00:55 New New ESOCast intro Title: ESOCast Episode 167: VLT sees 'Oumuamua getting a boost</p>	<p>New ESOCast introduction</p>

<p>01:08 [Narrator] 4. Oumuamua first came to the attention of astronomers by the end of 2017. Observatories around the world discovered that the object was a lonely voyager from interstellar space — the first of its kind to be observed.</p>	
<p>01:33 5. Statement Marco Micheli (ESA): For the first time we had evidence of an asteroid, an object, that was coming at a very high velocity into our Solar System. And the velocity was so high that it proved that the object was actually coming from the outside, that it was coming probably from another Solar System, and was just passing into our System.</p>	
<p>01:53 [Narrator] 6. Astronomers using ESO's Very Large Telescope and other observatories have shown that this peculiar object is moving faster than the laws of celestial mechanics predict. A result that caught the scientists by surprise!</p>	
<p>02:12 7. Statement Olivier Hainaut (ESO): We considered different values. One of them is an interaction with some magnetic field. Or another one would be an interaction with a force going along the trajectory – not really knowing what it would be, just to see if it works. Or a force that would be an impulse; like a small outburst or something like that. And all these hypothesis failed.</p>	

<p>02:41 [Narrator] 8. The most likely explanation for `Oumuamua's odd behaviour is that it is outgassing. Outgassing occurs when sunlight heats up the surface of an object. This causes it to vent a plume of gas that acts like a booster rocket. However, outgassing is a typical behaviour of comets, which now leads astronomers to suggest `Oumuamua is an interstellar comet, rather than an asteroid.</p>	
<p>03:13 [Narrator] 9. However, `Oumuamua shows no trace of typical cometary features. The interstellar visitor does not show a characteristic long tail of evaporating material. It also shows no evidence for a coma, an envelope of gas and dust surrounding most comets.</p>	
<p>03:36 10. Statement Olivier Hainaut (ESO): In terms of the quantity of dust and gas that is released: it's tiny. It is really not much. But it is very small, so you don't expect a lot of dust. And still, again, comparing with normal comets it's about right for such a small comet to have so little gas.</p>	
<p>03:58 [Narrator] 11. Astronomers speculate that perhaps the small dust grains adorning the surface of most comets eroded during `Oumuamua's journey through interstellar space, with only larger dust grains remaining. A cloud of these larger particles would not be</p>	

<p>bright enough to be detected by ESO's VLT.</p>	
<p>04:23 [Narrator] 12. The true nature of this interstellar nomad may remain a mystery; `Oumuamua's recently-detected gain in speed makes it unlikely that we will be able to accurately trace its origin. And as it is getting further away from Earth it becomes too distant for even the best telescopes in the world to observe.</p>	
<p>04:47 13. Statement Olivier Hainaut (ESO): We have never observed a comet like that before. But it's possible. We have never seen one. So, many differences, many things in common. So we really need to wait for the next one to start making comparisons.</p>	
<p>05:03 14. Statement Marco Micheli (ESA): So the hope is that in the future, with better telescopes, more telescopes searching the skies for asteroids, we will find more of these objects.</p>	
<p>05:11 [Narrator] 15. But what we have learned from `Oumuamua surprised us beyond our wildest imagination.</p>	
<p>05:20 [Outro]</p>	<p><i>Produced by ESO, the European Southern Observatory. Reaching new heights in Astronomy.</i></p>

