PHYSICS AND ASTRONOMY COLLOQUIUM

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"1I/'Oumuamua: the nearest exoplanet?"

Abstract

"When 'Oumuamua passed by Earth in October 2017, the only thing certain about it was that it was not from this Solar System. Because of its high velocity, it was the first confirmed interstellar object. The next year the object 2I/Borisov was the second confirmed interstellar object. But whereas Borisov behaved very much like a comet (albeit an unusual one), mysteries remain about what 'Oumuamua actually is. Although it pushed away from the Sun by a rocket effect, like comets, it could not be made of water, or contain much carbon monoxide or dust, making it very unlike a comet. The acceleration it experienced was very large, and from the variations in sunlight it reflected, it was more elongated than any other solar system object: either a very skinny pancake or a very long cigar. Dozens of explanations have been proposed to explain these oddities, and speculation has run rampant, with some astronomers even suggesting it was alien technology. The truth is more mundane but no less exciting. In a paper we've recently submitted, my colleague Alan Jackson and I demonstrate that 'Oumuamua is consistent in every way with being a small fragment resembling the surface of Pluto. Our own solar system must have ejected trillions of fragments like 'Oumuamua in its early days, and a population of fragments from the surfaces of Pluto-like exoplanets must be common throughout the Galaxy. 'Oumuamua itself may have been ejected about 400 million years ago, from a Pluto-like exoplanet in a young system in the Perseus arm of the Galaxy. 'Oumuamua is arguably the closest we've ever come to directly observing the surface of an exoplanet."

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