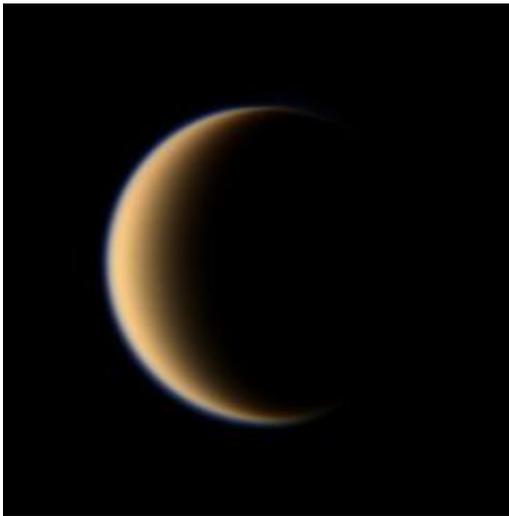


Usain Bolt's superhuman speed would give him the power of flight on Titan

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Titan's hazy orange globe hangs before the Cassini spacecraft. Image credit NASA/JPL/Space Science Institute.

We all know Usain Bolt is one of the fastest people on Earth. Now, students have shown his superhuman speeds would actually allow him to fly like a bird on one of Saturn's moons while wearing a wingsuit.

The world-record holding sprinter has reached top speeds of 12.27 metres per second, which would be fast enough for him to take off on Titan while wearing a regular wingsuit.

Theoretically, the Olympic athlete would then be able to soar above the

planet – without any need for propulsion.

Physics students at the University of Leicester made the calculations in their final year paper for the *Journal of Physics Special Topics*, a peer-reviewed student journal run by the University's Department of Physics and Astronomy.

Titan is Saturn's largest moon, and has a dense, nitrogen-rich atmosphere with a surface pressure almost 50 per cent stronger than Earth's.

As a result, it has long been predicted that humans would be able to lift off into the moon's atmosphere if they were wearing wing-type devices on their arms.

But now, the students have shown that it would even be possible with a regular wingsuit used by skydivers here on Earth – provided you could get a fast enough run up.

To calculate the speed needed, the group factored in: the density of air at the surface of Titan; the acceleration due to gravity; an average wingsuit wing area (approximately 1.4 metres squared); and the ratio of the streamline path of the air above the aerofoil to that below the aerofoil.

They found that, for a normal-sized wingsuit, a run up speed of 11 metres per second would be required.

Now, not many people in the world can run at this speed - but the fastest sprinters have been shown to reach top speeds above 11 metres per second.

Usain Bolt has clocked top speeds of 12.27 metres per second, meaning he would be able to take off as he got to the finish line of a 100-metre race.

The students also found it might even be possible for those of us who can't reach Bolt-like velocities to spread our arms and fly – but it would be a lot less comfortable, and we would look a lot dafter.

The group found you would be able to take off with a more manageable running speed of 6 metres per second – as long as you were wearing a wingsuit with a surface area more than three times larger than a regular-sized.

This would be a lot more cumbersome, and the students were unsure whether it would even be feasible in practice.

Student Hannah Lerman, 21, from Mill Hill, North London, said: "I had seen a lot of claims online that humans would be able to fly on Titan, but no one had given the physics behind it.

"I thought it would be interesting to try it with a wingsuit – something that you actually use on earth. It is a really exciting idea that someone like Usain Bolt could actually fly unaided. It would give a whole new dimension to travelling.

"I am really interested in the journal side of science, and it was really interesting to see how that was run as part of this module."

Titan has been held as a potentially-habitable destination for humans, as its atmosphere contains plenty of nitrogen, an essential part of the Earth's atmosphere – and there is evidence that the moon holds liquid water.

It is thought that water could be used to generate oxygen in the moon's atmosphere, potentially making the air breathable.

If this were the case, humans would be able to test out the students'

theory – although there are a number of issues which would need to be resolved before this could happen.

For instance, the temperature of the atmosphere is approximately -175 degrees Celsius.

Course tutor Dr Mervyn Roy, a lecturer in the University of Leicester's Department of Physics and Astronomy, said: "The aim of the module is for the students to learn about peer review and scientific publishing.

"The students are encouraged to be imaginative with their topics, and find ways to apply basic physics to the weird, the wonderful and the everyday."

More information: The full paper can be found at:
[physics.le.ac.uk/journals/inde ... article/view/625/420](https://physics.le.ac.uk/journals/index.php/physica/article/view/625/420)

Provided by University of Leicester

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