How Einstein could help unlock the mysteries of space travel

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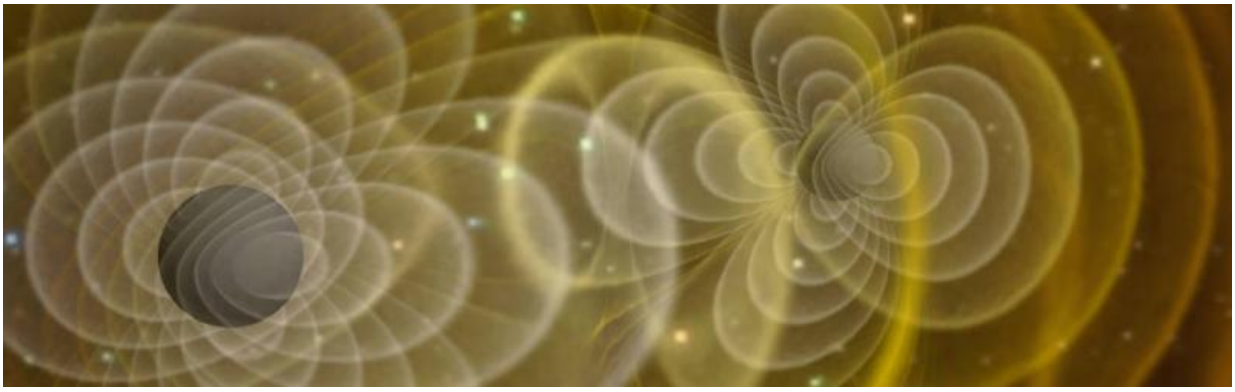

Warp drives might be the stuff of science fiction, but they could be a step closer to reality if we look to Einstein's theory of gravity, according to a University of Sydney researcher.

Professor of Astrophysics Geraint Lewis, from the School of Physics, discussed how new work on the famous theory is opening up fresh possibilities for space travel at his National Science Week talk, "Einstein's wonderful idea: A century of space-time, black holes and expanding universes" on Monday 17 August.

Albert Einstein first penned his theory of general relativity in 1915, but

we're only now starting to scratch the surface to see what the theory predicts, said Professor Lewis.

"One of the things coming out of the mathematics is a possible mechanism to allow us to travel through the universe nominally faster than the speed of light," he said.

"In the next 100 or 200 years, maybe the theory will give us solutions such as being able to travel efficiently and at high speeds across the universe."

Maths fiend

Einstein's theory of general relativity went largely ignored in the science community for many years after its publication as it was considered "mathematically fiendish," said Professor Lewis.

"We've now come to realise that the theory is very important to modern science, as it not only describes the entire universe, it also predicts some very strange things, like black holes," he said.

Einstein's description of gravity underpins such modern innovations as Global Positioning Systems (GPS), which rely on differing clock rates in orbit and on Earth. But extending this same understanding of how space and time can bend also holds exciting possibilities for our space travel ambitions, Professor Lewis argued.

He pointed out to the growing industry working to detect the behaviour of gravitational waves – ripples in the curvature of space-time first predicted by Albert Einstein in 1916 – as an example of the potential breakthroughs in the not-too-distant future.

Space-time wobble

"If you have really violent events in the universe, it can cause space and time to wobble. It's been a dream for the past 50 years to detect these wobbles – and we are getting closer. There are some new gravitational telescopes being built that are trying to get the sensitivity to detect the waves," Professor Lewis said.

"Once we can detect gravitational waves, then we are going to be able to see the most violent explosions and collisions in the universe. That's going to be an absolutely amazing advancement: We'll have a brand new window on the universe."

While Einstein's general theory of relativity now sits with quantum mechanics as one of the major pillars of scientific understanding, Professor Lewis believes the next century will see many more surprises.

"It's still a bit of a theoretical curiosity for everyday people, but in terms of a scientific idea, it's got wide-reaching consequences. When we finally unite Einstein's theory and quantum mechanics together, we're likely to reveal many more secrets of the universe."

Provided by University of Sydney

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