



Shockwaves Could Crinkle Space-Time Creating A New Kind Of Singularity

17 July, 2012

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MessageToEagle.com - Mathematicians have discovered a new way to crinkle up the fabric of space-time, at least in theory.

"We show that space-time cannot be locally flat at a point where two shock waves collide," said Blake Temple, professor of mathematics at UC Davis.

"This is a new kind of singularity in general relativity."

The results are reported in two papers by Temple with graduate students Moritz Reintjes and Zeke Vogler, respectively, both published in the journal Proceedings of the Royal Society A.

Einstein's theory of general relativity explains gravity as a curvature in space-time. But the theory starts from the assumption that any local patch of space-time looks flat, Temple said.

A singularity is a patch of space-time that cannot be made to look flat in any coordinate system, Temple said. One example of a singularity is inside a black hole, where the curvature of space becomes extreme.

Temple and his collaborators study the mathematics of how shockwaves in a perfect fluid can affect the curvature of space-time in general relativity.

In earlier work, Temple and collaborator Joel Smoller, the Lamberto Cesari professor of mathematics at the University of Michigan, produced a model for the biggest shockwave of all, created from the Big Bang when the universe burst into existence.

A shockwave creates an abrupt change, or discontinuity, in the pressure and density of a fluid, and this creates a jump in the curvature.

But it has been known since the

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Every few thousand years, it coughs out a nearly spherical shell of gas as a layer of helium around its core begins to fuse.

Earth Is In The Middle Of A Space-Time Vortex



Earth sits in the middle of a space-time vortex. Einstein predicted this almost 100 years ago and he was right. Space-time around Earth seems

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1960s that the jump in curvature created by a single shock wave is not enough to rule out the locally flat nature of space-time.

Vogler's doctoral work used mathematics to simulate two shockwaves colliding, while Reintjes followed up with an analysis of the equations that describe what happens when shockwaves cross.

He found this created a new type of singularity, which he dubbed a "regularity singularity."

What is surprising is that something as mild as interacting waves could create something as extreme as a space-time singularity, Temple said.

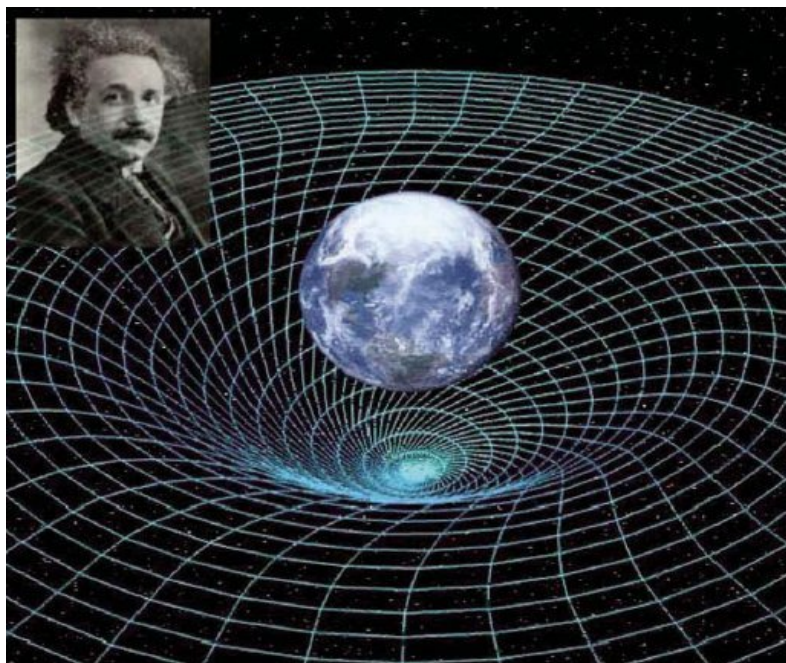


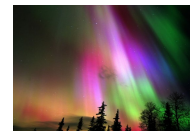
Illustration of twisted space-time around Earth. Image credit: NASA

Temple and his colleagues are investigating whether the steep gradients in the space-time fabric at a regularity singularity could create any effects that are measurable in the real world.

For example, they wonder whether they might produce gravity waves, Temple said. General relativity predicts that these are produced, for example, by the collision of massive objects like black holes, but they have not yet been observed in nature. Regularity singularities could also

Space-time around Earth seems to be distorted, just a general relativity predicts. Time and space, according to Einstein's theories of relativity, are woven together, forming a four-dimensional fabric called "space-time."

Still A Mystery: Are Baffling Clap Sounds Related To Aurora Borealis?



These strange sounds from aurora borealis have been reported by wilderness

wanderers and other individuals but no connection has ever been proven. For the first time, researchers at Aalto University in Finland have located where the sounds associated with the northern lights are created.

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Powerful Cosmic Force Almost Destroyed Earth



In our article **Powerful Jet Pointing Directly At Earth** we discussed one of

the most fascinating cosmic phenomena, known to astronomers as blazars. A very interesting, but also frightening event took place back some years ago when satellites and observatories suddenly registered

be formed within stars as shockwaves pass within them, the researchers theorize.

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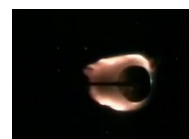
Observatories suddenly registered an extremely powerful cosmic force that almost destroyed Earth...

Look How It's Glowing! Mysteriously Beautiful Fukang Meteorite Is A Precious Cosmic Wonder



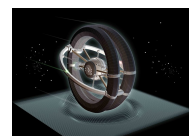
It is a truly breathtaking sight! What makes the meteorite so extraordinary is without doubt its amazing glow! When the Fukang meteorite slammed into the surface of Earth, one suspected this extraterrestrial gemstone could mirror the stellar beauty of the cosmos, and it did!

Watch How Fire Behaves Differently In Space!



Fire in space behaves differently than on Earth. See for yourself. The ISS crew conducted some interesting, yet dangerous experiment with fire. Data from the experiment can be used to upgrade fire detection and suppression equipment on Earth and Space.

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for spacecraft to travel long distances in space rapidly, by deforming the space-time continuum in a bubble around the spaceship. Miguel Alcubierre, a Mexican physicist, proposed this warp drive in 1994 as a way to travel globally faster than light, overcoming the limit on particles travelling at such speeds in Einstein's theory of special relativity.

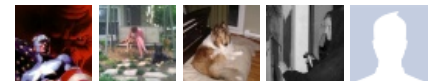
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