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according to the Standard Model of cosmology.

"We're saying that maybe the resulting expanding wave is

actually causing the anomalous acceleration," said Blake

Temple of the University of California, Davis. "We're saying that <u>dark energy</u> may not really be the correct explanation."

The researchers derived a set of equations describing expanding waves that fit Einstein's theory of general relativity, and which could also account for the apparent acceleration. Temple outlines the new idea with Joel Smoller of the University of Michigan in the Aug. 17 issue of the journal Proceedings of the National Academy of Sciences.

While more research will be needed to see if the idea holds up, "the research could change the way astronomers view the composition of our universe," according to a summary from the journal.

To convince other cosmologists, the new model will have to pass muster with further inquiry.

"There are many observational tests of the standard cosmological model that the proposed model must pass, aside from the late phase of accelerated expansion," said Avi Loeb, director of the Institute for Theory and Computation at the Harvard-Smithsonian Center for Astrophysics. "These include big bang nucleosynthesis, the quantitative details of the microwave background anisotropies, the Lyman-alpha forest, and galaxy surveys. The authors do not discuss how their model compares to these tests, and whether the number of free parameters they require in order to fit these observational constraints is smaller than in the standard model. Until they do so, it is not clear why this alternative model should be regarded as advantageous."

Johns Hopkins University astrophysicist Mario Livio agreed that to be seriously considered, the model must be able to predict properties of the universe that astronomers can measure.

He said the real test "is in whether they are able to reproduce all the observed cosmological parameters (as determined, e.g. by a combination of the Hubble Constant and the parameters determined by the CMB observations). To only produce an apparent acceleration is in itself interesting, but not particularly meaningful."





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## Inconvenient truths

Dark energy is itself a hasty fix to an <u>inconvenient truth</u> discovered by astronomers in the late 1990s: that the universe is expanding, and the rate of this expansion seems to be constantly picking up speed.

To explain this startling finding, cosmologists invoked dark energy, a hypothetical form of energy that is pulling the universe apart in all directions (note that dark energy is wholly separate from the equally mysterious concept of <u>dark matter</u> - a hypothetical form of matter that populates the universe, interacting gravitationally with normal matter, but which cannot be seen with light). In this interpretation, the whole universe is blowing up like a balloon, and from any given point within it, all distant objects appear to be speeding away from you.

But not everyone is happy with the dark energy explanation.

"It just seems like an unnatural correction to the equations - it's like a fudge factor," Temple told SPACE.com. "The equations don't make quite as much physical sense when you put it in. You just put it in to fit the data."

Temple and Smoller think the idea of an expanding wave makes more sense.

"At this stage we think this a very plausible theory," Temple said. "We're saying there isn't any acceleration. The galaxies are displaced from where they're supposed to be because we're in the aftermath of a wave that put those galaxies in a slightly different position."

# **Ripples in a pond**

Temple compared the wave to what happens when you throw a rock into a pond. In this case, the rock would be the Big Bang, and the concentric ripples that result are like a series of waves throughout the universe. Later on, when the first galaxies start to form, they are forming inside space-time that has already been displaced from where it would have been without the wave. So when we observe these galaxies with telescopes, they don't appear to be where we would expect if there had never been a big wave. One potential issue with this idea is that it might require a big coincidence.

For the universe to appear to be accelerating at the same rate in all directions, we in the Milky Way would have to be near a local center, at the spot where an expansion wave was initiated early in the Big Bang when the universe was filled with radiation.

Temple concedes that this is a coincidence, but said it's possible that we are merely in the center of a smaller wave that affects the galaxies we can see from our vantage point - we need not be in the center of the entire universe for the idea to work.

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FlatEarth wrote: posted 20 August 2009, 6:10 pm ET \*bigger sigh\*

If you read and understood my comment, you would understand that in this explanation every object isn't accelerating at all. It's just an illusion caused by the expanding universe. This expansion is not limited to the outer fringes of the universe: it's happening all around us. The driving force of this phenomenon is unknown, but I put a thought out there for discussion sake, and to hopefully hear some other thoughts.

The challenge here is to think outside the box. We live in a strange universe where there's more going on than simple vectored forces. Are you capable of widening your field of view, Guanaco? You don't exhibit that ability in your comments to date.







|                     | <b>DW_Wright</b> posted 19 August 2009, 2:28 am ET wrote:                                                                                                                                                                                                                                                                              |       |               |     |        | ΕT        |     |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------|-----|--------|-----------|-----|
|                     | To expand upon Bill's idea -oh yea no relation here,<br>just a long time reader of this site and thought I'd<br>use my name as well lol- the x's ripples in the pond<br>idea what if there was no SINGLE big bang but more<br>along the lines of x's ones instead? and the center of<br>each "raindrop" was the source of a new "bang" |       |               |     |        |           |     |
|                     | Reply                                                                                                                                                                                                                                                                                                                                  | Reco  | ommend        | (0) | Rep    | ort Abu   | se  |
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