

'Big Wave' Theory Offers Salbscribe to Our to Dark Energy Free Newsletter:

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By Clara Moskowitz 18 August 2009. Mathematicians have proposed an alternative explanation for the accelerating expansion of the universe that does not rely on the mystifying idea of dark energy.

According to the new proposition, the universe is not accelerating, as observations suggest. Instead, an expanding wave flowing through space-time has caused distant galaxies to appear to be accelerating away from us. This big wave, initiated after the Big Bang that is thought to have sparked the universe, could explain why objects today appear to be farther away from us than they should be according to the Standard Model of cosmology.

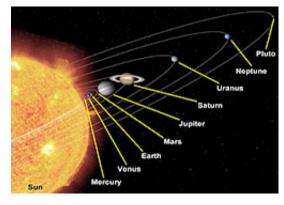
"We're saying that maybe the resulting expanding wave is actually causing the anomalous acceleration," said Blake Temple of the University of California, Davis. "We're saying that dark energy may not really be the correct explanation."

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."

Inconvenient truths

Dark energy is itself a hasty fix to an inconvenient truth 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...MORE...

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