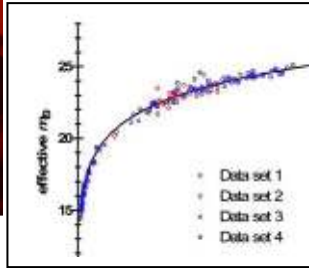


# Phật và khoa học dạy thuyết khó tin



The Physics  
arXiv Blog

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## Big Bang Abandoned in New Model of the Universe

A new cosmology successfully explains the accelerating expansion of the universe without dark energy; **but only if the universe has no beginning and no end.**

**Không sanh cũng không diệt...**

As one of the few astrophysical events that most people are familiar with, the Big Bang has a special place in our culture. And while there is scientific consensus that it is the best explanation for the origin of the Universe, the debate is far from closed. However, it's hard to find alternative models of the Universe without a beginning that are genuinely compelling.

That could change now with the fascinating work of Wun-Yi Shu at the National Tsing Hua University in Taiwan. Shu has developed an innovative new description of the Universe in which the roles of time space and mass are related in new kind of relativity.

Shu's idea is that time and space are not independent entities but can be converted back and forth between each other. In his formulation of the geometry of spacetime, the speed of light is simply the conversion factor between the two. Similarly, mass and length are interchangeable in a relationship in which the conversion factor depends on both the gravitational constant G and the speed of light, neither of which need be constant.

So as the Universe expands, mass and time are converted to length and space and vice versa as it contracts.

This universe has no beginning or end, just alternating periods of expansion and contraction. In fact, Shu shows that singularities cannot exist in this cosmos. It's easy to dismiss this idea as just another amusing and unrealistic model dreamed up by those whacky cosmologists.

That is until you look at the predictions it makes. During a period of expansion, an observer in this universe would see an odd kind of change in the red-shift of bright objects such as Type-I supernovas, as they accelerate away. It turns out, says Shu, that his data exactly matches the observations that astronomers have made on Earth.

This kind of acceleration is an ordinary feature of Shu's universe.

That's in stark contrast to the various models of the Universe based on the Big Bang. Since the accelerating expansion of the Universe was discovered,

cosmologists have been performing some rather worrying contortions with the laws of physics to make their models work.

The most commonly discussed idea is that the universe is filled with a dark energy that is forcing the universe to expand at an increasing rate. For this model to work, dark energy must make up 75 per cent of the energy-mass of the Universe and be increasing at a fantastic rate.

But there is a serious price to pay for this idea: the law of conservation of energy. The embarrassing truth is that the world's cosmologists have conveniently swept under the carpet one of the fundamental laws of physics in an attempt to square this circle.

That paints Shu's ideas in a slightly different perspective. There's no need to abandon conservation of energy to make his theory work.

That's not to say Shu's theory is perfect. Far from it. One of the biggest problems he faces is explaining the existence and structure of the cosmic microwave background, something that many astrophysicists believe to be the strongest evidence that the Big Bang really did happen. The CMB, they say, is the echo of the Big bang.

How it might arise in Shu's cosmology isn't yet clear but I imagine he's working on it.

Even if he finds a way, there will need to be some uncomfortable rethinking before his ideas can gain traction. His approach may well explain the Type-I supernova observations without abandoning conservation of energy but it asks us to give up the notion of the Big Bang, the constancy of the speed of light and to accept a vast new set of potential phenomenon related to the interchangeable relationships between mass, space and time.

Rightly or wrongly, that's a trade off that many will find hard. Let's hope Shu sticks to his guns, if only for the sake of good old-fashioned debate.

Ref: [arxiv.org/abs/1007.1750](http://arxiv.org/abs/1007.1750): Cosmological Models with No Big Bang  
Source: Cornell University, Ithaca, NY 14853

TÂM KINH BÁT-NHÃ  
BA-LA-MẬT-ĐA

Bồ-tát Quán-Tự-Tại  
Khi quán chiếu thâm sâu  
Bát-nhã Ba-la-mật  
(tức diệu pháp trí độ)  
Bồng soi thấy năm uẩn  
Đều không có tự tánh.  
Thực chứng điều ấy xong,  
Ngài vượt thoát tất cả,  
Mọi khổ đau ách nạn.  
Nghe đây Xá-Lợi-Tử:  
Sắc chẳng khác gì không  
Không chẳng khác gì sắc.  
Sắc chính thực là không,  
Không chính thực là sắc.  
Còn lại bốn uẩn kia

Cũng đều như vậy cả.  
Xá-Lợi-Tử nghe đây:  
Thể mọi pháp đều không  
Không sanh cũng không diệt  
Không như cũng không sạch  
Không thêm cũng không bớt.  
Cho nên trong tánh không  
Không có sắc, thọ, tưởng  
Cũng không có hành thức  
Không có nhãn nhĩ, tỷ,  
Thiệt, thân, ý (sáu căn).  
Không có sắc, thanh, hương  
Vị, xúc, pháp (sáu trần).  
Không có mười tám giới  
Từ nhãn đến ý thức  
Không hề có vô minh  
Không có hết vô minh  
Cho đến không lão, tử.

Không khổ, tập, diệt, đạo.  
Không trí, cũng không đắc  
Vì không có sở đắc  
Khi một vị Bồ-tát  
Nương diệu pháp Trí Độ  
(Bát-nhã Ba-la-mật)  
Thì tâm không chướng ngại  
Vì tâm không chướng ngại  
Nên không có sợ hãi  
Xa lìa mọi điên đảo  
Đạt Niết-bàn tuyệt đối.  
Chư Phật trong ba đời  
Y diệu pháp Trí Độ  
(Bát-nhã Ba-la-Mật)  
Nên đắc vô thượng giác.  
Vậy nên phải biết rằng  
Bát-nhã Ba-la-mật  
Là linh chú đại thần

Là linh chú đại minh  
Là linh chú vô thượng  
Là linh chú tuyệt đỉnh  
Là chân lý bất vọng  
Có năng lực tiêu trừ  
Tất cả mọi khổ nạn.  
Cho nên tôi muốn thuyết  
Câu thần chú Trí Độ  
Bát-nhã Ba-la-mật."  
Nói xong đức Bồ-tát  
Liên đọc thần chú rằng:  
Yết-đế, yết-đế  
Ba-la yết-đế,  
Ba-la tăng-yết-đế,  
Bồ-đề Tát ba ha.  
Ma-ha Bát-nhã Ba-la-  
mật đa.  
(3 lần, 1 tiếng chuông)