

## THE UNIVERSE RINGING LIKE A CRYSTAL GLASS

Two physicists at the University of Southern Mississippi – **Lawrence Mead** and **Harry Ringermacher** – announced today (June 26, 2015) that our universe might not only be expanding outward from the Big Bang, but also oscillating or “ringing” at the same time. The *Astronomical Journal* published their paper on this topic in April. They claim the universe’s expansion has sped up, then slowed down, 7 times since time began and describe this oscillation as the universe “ringing.”

Scientists today believe our universe – all space, time and matter – began with the Big Bang some 13 billion years ago. Since then, the universe has been expanding to the size it is today. In 1978 **Arno Allan Penzias** and **Robert Woodrow Wilson** received the Nobel prize for their 1964 discovery of the key signature of this theory, the primal radiation from the early universe known as the “cosmic microwave background” (CMB).

Then in 1998 the finding that the universe was not only expanding, but was speeding up, or accelerating in its expansion was a shock when it was discovered simultaneously by east coast and west coast teams of astronomers and physicists. A new form of matter, dark energy, repulsive in nature, is assumed to be responsible for the speed-up. The teams led by **Saul Perlmutter**, **Adam Riess**, and **Brian Schmidt** won the 2011 Nobel Prize in Physics for that discovery.”

Yet, the universe as a whole has self-gravity, which tries to pull all the matter – all the stars, gas, galaxies, and mysterious dark matter – back together. This internal gravitational pull slows down the universe’s expansion. The physicists’ new finding suggests that the universe has slowed down and speeded up, not just once, but 7 times in the last 13.8 billion years. This ringing has been decaying and is now very small – much like striking a crystal glass and hearing it ring down.

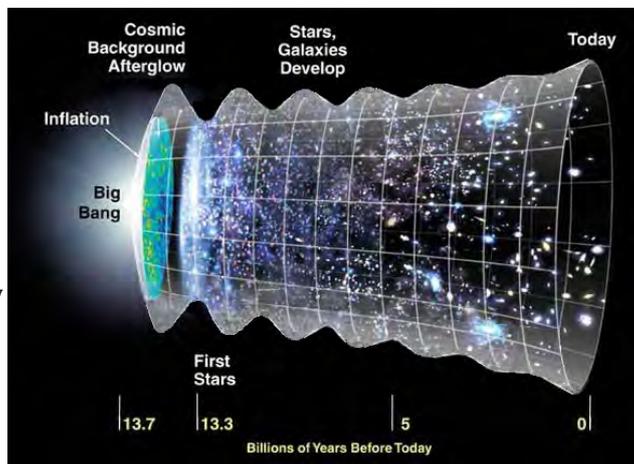
The wave amplitude in this illustration is highly exaggerated, but the frequency is roughly correct according to their study and their understanding of the way in which the universe oscillates or “rings.” This oscillation is not a wave moving through the universe, such as a gravitational wave, but rather it is a “wave of the universe.” That is the universe as a whole is doing it.

The physicists made their discovery accidentally when, through their collaboration on dark matter modelling of galaxies, they found a new way of plotting a classic textbook graph describing the scale of the universe against its age (look-back time) that did not depend on one’s prior choice of models of the universe – as was traditional. The standard graph, the Hubble diagram, is constructed by astronomers observing the distances of Type 1A Supernovae that serve as ‘standard candles’ for measuring the expansion of the universe.

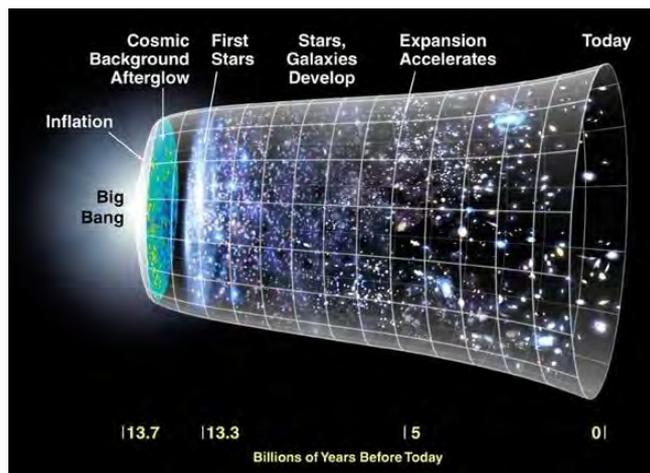
Analysing this new plot to locate the transition time of the universe, they found there was more than one such time – in fact multiple oscillations with a frequency of about 7 cycles over the lifetime of the universe. It is space itself that has been speeding up its expansion followed by slowing down 7 times since creation.

The finding must ultimately be verified by independent analyses, preferably of new supernovae data, to confirm its reality. In the meantime, their work into the “ringing” of the universe continues.

Compare the illustration at top to the artist’s illustration to the right, which represents the current model of the universe (notice: no oscillation). AK from EarthSky Notes



Artist's concept of an oscillating or 'ringing' universe.



Artist's concept representing the events of the Big Bang from the beginning of time to the present day as described by the current, accepted Big Bang model.