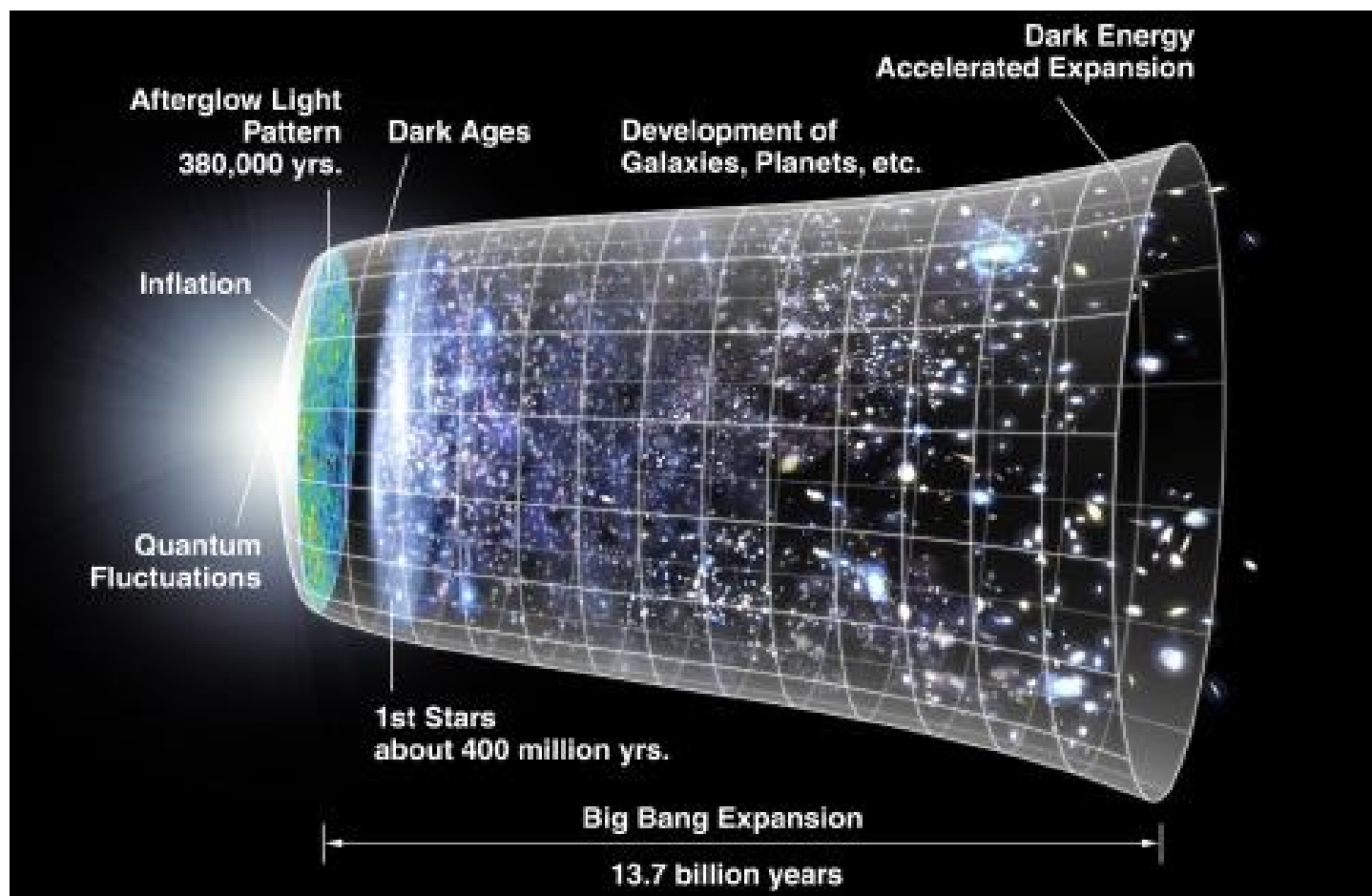


WHAT IF THE UNIVERSE HAD NO BEGINNING?

In cosmology a hypothesis is circulating at the moment that claims to prove there was no Singularity at the time of the Big Bang. But then, to paraphrase Mark Twain's famous expression, reports of the death of the Big Bang have been greatly exaggerated. The Big Bang theory is still alive and well. It helps to explain so many other things. At the same time, it means our universe may not have a beginning or an end.



The catch is that by eliminating the singularity, the model predicts that the universe had no beginning. It existed forever as a kind of quantum potential before ‘collapsing’ into the hot dense state we call the Big Bang. Unfortunately many articles confuse ‘no singularity’ with ‘no big bang.’ Most of us understand the Big Bang as the idea that our entire universe came from a single point, what astrophysicists call a “singularity.” But we might not need a singularity to have a Big Bang, according to a new study.

The new model – in which our universe has no beginning and no end – comes from **Ahmed Farag Ali at Benha University** in Egypt and coauthor **Saurya Das** at the University of Lethbridge in Alberta, Canada. Their paper looks at a result derived from **Einstein’s** theory of general relativity known as the **Raychaudhuri equation**. Basically his equation describes how a volume of matter changes over time, so its a great way of finding where physical singularities exist in your model. But rather than using the classical Raychaudhuri equation, the authors use a variation with a few quantum tweaks. This approach is often called semi-classical ... One appealing feature of the new paper is that it also predicts a cosmological constant, a concept originally introduced by Albert Einstein in 1917. The idea of a cosmological constant was discarded for some decades, but, since the 1990s, developments in cosmology have revived the idea that we need one to explain the universe as we observe it. It should be noted that replacing the Big Bang singularity with an eternal history isn’t a new idea. Many inflation models, for example, make similar predictions.

Unless we can come to grips with the concepts of infinity and eternal, no amount of fiddling and tweaking with the Big Bang Theory will advance our thinking beyond this hurdle. The nature of Space and Time, and how they fit into what gave rise to them, needs to be better understood. To use the concept of an explosion in our space and time as the driving force behind the cosmic expansion is simplistic and childish, and not a scientific explanation.

It will be interesting to see if this model ignites new and serious interest among cosmologists and ultimately contributes to a better understanding of the Big Bang theory, which has been a fact of most of our lives since we were born.

AK, from EarthSky Notes