Scientists debate the seriousness of problems with the value of the Hubble Constant

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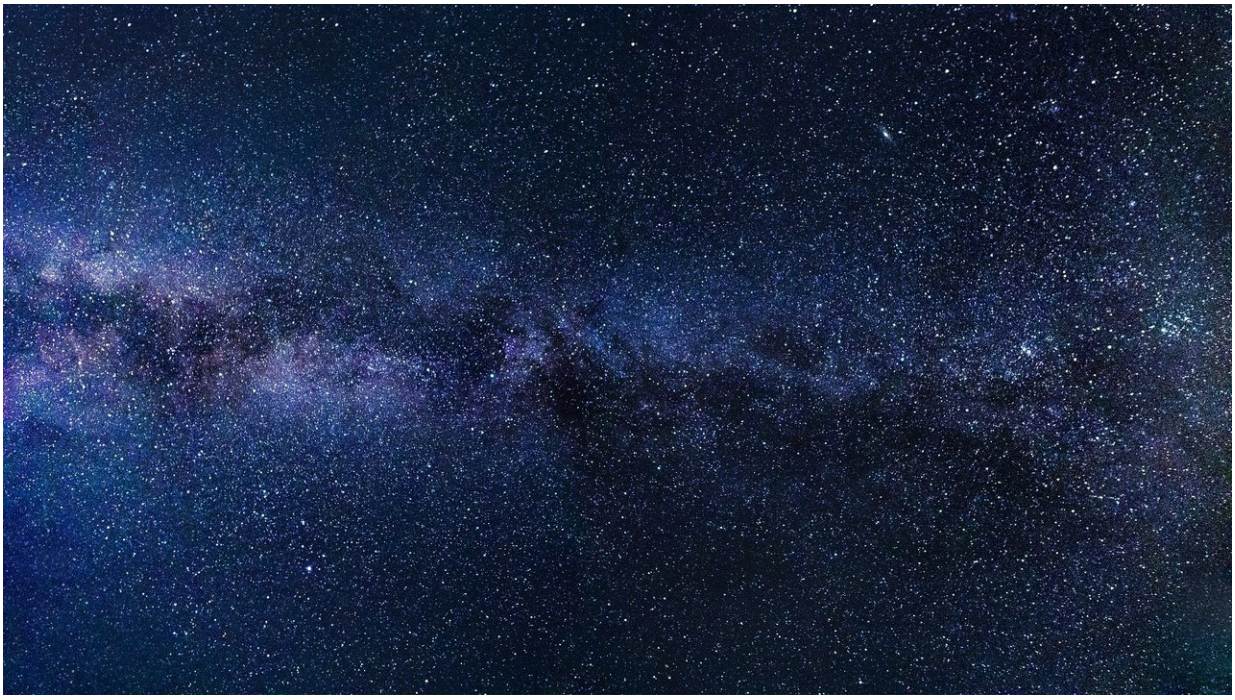

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Astronomers, astrophysicists and particle physicists gathered recently at the Kavli Institute for Theoretical Physics at the University of California to discuss the seriousness of differing measurements of the Hubble Constant. They met to talk about a problem that has become a major concern in astrophysics—figuring out how fast the universe is actually expanding.

Estimates of its value based on studying the light emitted from the Big Bang differ from those calculated using data from supernovas. Put a simpler way, researchers using data from studies involving the oldest history of the universe have calculated a different value for the Hubble Constant than those involved in studying more recent activity. And the reason it has become such a hot topic is because if a reasonable reason for the differences cannot be found, scientists in the field might have to completely rethink how the universe works.

The basis of the debate began back in the 1920s when Edwin Hubble noted that the farthest objects in the universe appear to be moving away from one another faster. Theorists suggested a fixed number could be used to express just how fast the universe was expanding—thus the Hubble Constant was born. It is defined as the rate of expansion of the universe. As its name implies, theory suggests it is a single unchanging number. But experiments to find the true value of the Hubble Constant have delivered mixed results.

One technique involves using data from devices that measure the cosmic microwave background, which is believed to be light emitted not long after the Big Bang. Such studies have shown the Hubble Constant to be 67.4 km/s/Mpc, with an error rate of just 0.5 km/s/Mpc. Meanwhile, other studies involving use of data from supernova have found the constant to be 74.0 km/s/Mpc—a far cry from the first error rate. Clearly both cannot be correct, unless there was something odd going on during the early expansion of the universe. Some physicists believe it is possible that there was a different kind of dark energy pushing the universe apart back then, accounting for the difference.

In any case, the researchers at the recent meeting voted against calling it a crisis, suggesting that few in the field are ready to throw out major theories underlying the understanding of how the universe works—at least not right now.

More information: Joshua Sokol. New tactics clash on speed of expanding universe, *Science* (2019). DOI: 10.1126/science.365.6451.306