# Article information:

The Universe Began with a Bang, Not a Bounce, New Studies Find - Scientific American
<https://www.scientificamerican.com/article/the-universe-began-with-a-bang-not-a-bounce-new-studies-find/>

# Article summary:

1. Two recent studies have poked holes in different models of a bouncing universe, suggesting that the universe we see around us is probably a one-and-done proposition.

2. One model that averts singularities and makes the cosmic microwave background (CMB) anomalies a little less anomalous is known as loop quantum cosmology (LQC), but data from the Planck space observatory showed no significant sign of a bispectrum imprint, ruling out signs of an LQC-driven cosmic bounce in Planck data.

3. Physicist William Kinney co-authored the second recent analysis, which suggests that the universe probably had a beginning, implying a big bang occurred at some point, even if that event happened many bouncing universes ago, which in turn suggests that it took a singularity to get everything going in the first place.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article "The Universe Began with a Bang, Not a Bounce, New Studies Find" discusses recent research that has poked holes in different models of a bouncing universe. The most widely accepted explanation for the history of the universe is the big bang model, followed by a period of rapid expansion known as cosmic inflation. However, proponents of bouncing universes argue that our cosmos didn’t emerge on its own out of nothing. Instead, advocates claim, a prior universe shrunk in on itself and then regrew into the one we live in.

The article presents two studies that suggest the universe we see around us is probably a one-and-done proposition and not an eternally cycling universe. One study co-authored by Ruth Durrer and Paola Delgado looked for astronomical signs of loop quantum cosmology (LQC), which relies on a bridge between classical physics and quantum mechanics known as loop quantum gravity to solve some problems, especially the singularity problem. However, when they compared their calculation with present-day Planck CMB data, there was no significant sign of a bispectrum imprint.

Another study co-authored by William Kinney and Nina Stein calculated that if the universe increases in entropy and disorder with each bounce, the amount of usable energy available decreases each time. In that case, the cosmos would have had larger amounts of useful energy in earlier epochs. If you extrapolate back far enough, that implies a big bang–like beginning with an infinitely small amount of entropy, even for a universe that subsequently goes through cyclic bounces.

The article presents both sides equally but does not explore counterarguments or potential biases in detail. It also does not note possible risks associated with bouncing universes or cyclic cosmologies. Overall, it provides an informative overview of recent research on the origins and evolution of the universe but could benefit from more critical analysis and exploration of alternative perspectives.

# Topics for further research:

* Criticisms of bouncing universe models
* Risks associated with cyclic cosmologies
* Alternative explanations for the origins of the universe
* The singularity problem in cosmology
* Loop quantum gravity and its implications for cosmology
* Entropy and the evolution of the universe

# Report location:

<https://www.fullpicture.app/item/0dd3e488bc98dd17092774377dcfe716>