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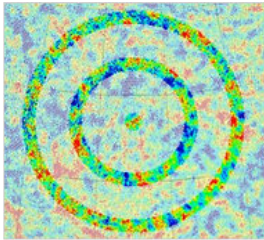
Rings in Sky Leave Alternate Visions of Universes

By DENNIS OVERBYE

Published: December 13, 2010

Last month a pair of physicists [startled the world](#) by claiming that they had managed to see through the Big Bang and glimpse evidence of previous incarnations of the universe in an analysis of radio signals from the sky.

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Roger Penrose and Vahe Gurzadyan

OUR UNIVERSE OR EARLIER?

Groups of astronomers have differing explanations for the timing of these rings.

The evidence, said Roger Penrose of [Oxford University](#) and Vahe Gurzadyan of Yerevan State University in Armenia, takes the form of concentric rings caused by the collisions of supermassive black holes in earlier versions of our universe and imprinted, like ripples on a pond, on a haze of microwave radiation widely thought to be left over from the Big Bang that started our own cycle of time about 13.7 billion years ago.

Now, however, two other groups of astronomers looking at the same data have concluded that the rings, though real, are part of the current universe we already know and love.

The cosmic microwave background, as it is known, has been much scrutinized since its discovery in 1965 by radio telescopes, balloons and three satellites — [NASA's Cosmic Background Explorer](#) and [Wilkinson Microwave Anisotropy Probe](#) satellites and, most recently, Europe's [Planck satellite](#) — for clues to the origin of the universe. Slight temperature deviations in what is otherwise an exceedingly uniform heat bath are thought to arise from [microscopic fluctuations in a force field known as inflation that drove the expansion of the universe](#) when it was but a sliver of a nanosecond old.

The rings seen by Dr. Penrose and Dr. Gurzadyan are thin bands in which the noisy pattern of heat and cold in the early universe, as recorded by the Wilkinson satellite and other experiments, is slightly less splotchy than normal. They posted a copy of their [paper](#) on the Internet on Nov. 16, noting that the rings confirmed a prediction of a theory recently proposed by Dr. Penrose, one of the world's distinguished mathematicians, called Conformal Cyclic Cosmology. It is the subject of a new book by him, "[Cycles of Time: An Extraordinary New View of the Universe](#)," due out in May from Knopf.

Mainstream cosmologists, [who have seen a long list of anomalies in the cosmic background](#) come and go, were not impressed. Now their skepticism is supported by two groups of cosmologists, [Ingunn Kathrine Wehus and Hans Eriksen](#) of the University of Oslo in Norway and [Adam Moss, Douglas Scott and James P. Zibrin](#), all of the University of British Columbia. In separate papers based on data from the Wilkinson satellite, both groups reported finding such rings, but said the rings were consistent with having arisen by chance in the earliest moments of our own universe. Eternity is not needed to explain them.

Dr. Moss and his colleagues wrote, "Gurzadyan and Penrose have not found evidence for pre-Big Bang phenomena, but have simply rediscovered that the CMB contains structure."

[David Spergel](#), a [Princeton University](#) astrophysicist and one of the members of the Wilkinson satellite team, said in a e-mail message: "While it would have been exciting to

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see circles from the pre-Big Bang universe, I view this as science at its best. Exciting claims are made and they draw the attention of cosmologists throughout the world. Because the WMAP data is publicly available, groups throughout the world were able to check the claim. A universe with [dark matter](#), [dark energy](#) and inflation is bizarre enough — we don't, however, get to detect circles from alternative universes.”

But visions of alternative universes keep coming. On Thursday, an international group led by Stephen M. Feeney of University College, London, [reported](#) that they had found tentative evidence of blobs in the microwave data that could be bruises from collisions with other universes that bubbled off from our own during the inflation epoch. The evidence, they acknowledged, was too weak to get excited about yet, but could be improved by the Planck satellite, now scanning the sky and expected to report its results in 2012.

“If this evidence is corroborated by upcoming data from the Planck satellite, we will be able to gain insight into the possible existence of the multiverse,” the authors wrote.

Dr. Spergel and Max Tegmark, a cosmologist at [M.I.T.](#), both said the group seemed to have done a careful job of analysis. Dr. Tegmark said, “This is going on the list of things people will be majorly looking for in the Planck data.”

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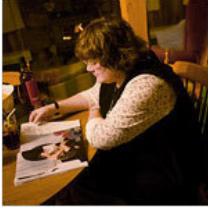
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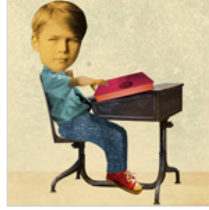
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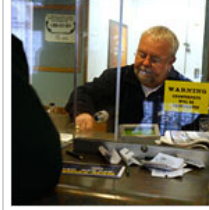
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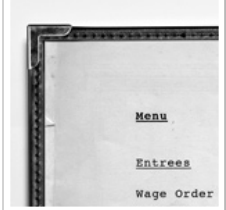
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