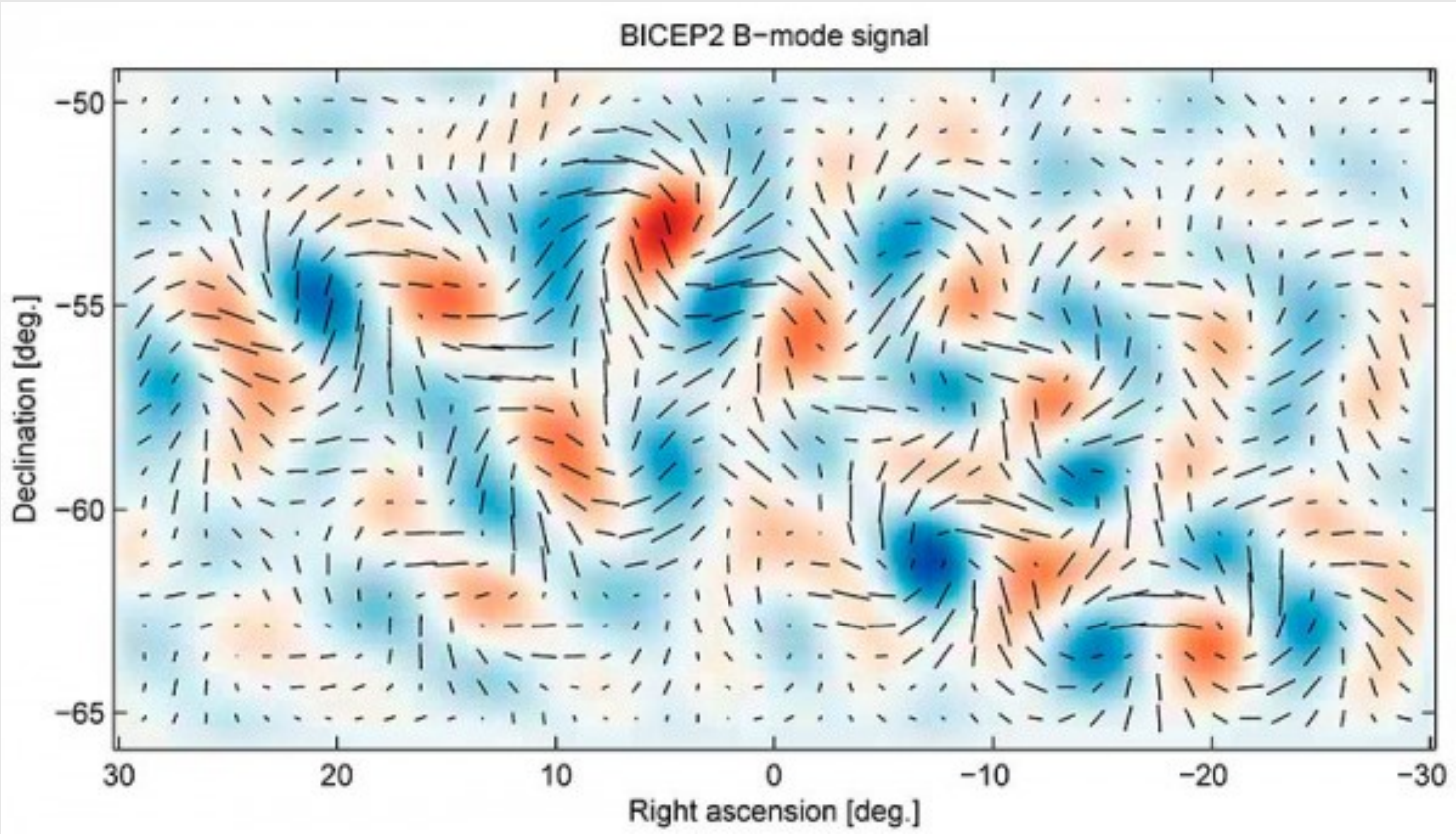
# Blockbuster Big Bang Result May Fizzle, Rumor Suggests




The biggest discovery in cosmology in a decade could turn out to be an experimental artifact—at least according to an Internet rumor. The team that reported the discovery is sticking by its work, however.

Eight weeks ago, researchers working with a specialized telescope at the South Pole reported the observation of pinwheel-like swirls in the polarization of the afterglow of the big bang, or cosmic microwave background (CMB). Those swirls are traces of gravitational waves rippling through the fabric of spacetime a sliver of a second after the big bang, argue researchers working with the Background Imaging of Cosmic Extragalactic Polarization 2 (BICEP2) telescope. Such waves fulfilled a prediction of a wild theory called inflation, which says that in the first $10^{-32}$ seconds, the universe underwent a mind-boggling exponential growth spurt. Many scientists hailed the result as a "smoking gun" for inflation.

However, scientists cautioned that the result would have to be scrutinized thoroughly. And now a potential problem with the BICEP analysis has emerged, says Adam Falkowski, a theoretical particle physicist at the Laboratory of Theoretical Physics of Orsay in France and author of the Résonaances blog. The BICEP researchers mapped the polarization of the CMB across a patch of sky measuring 15° by 60°. To study the CMB signal, however, they first had to subtract the "foreground" of microwaves generated by dust within our galaxy, and the BICEP team may have done that incorrectly, Falkowski reports on his blog today.

To subtract the galactic foreground, BICEP researchers relied on a particular map of it generated by the European Space Agency's spacecraft Planck, which mapped the CMB across the entire sky from 2009 until last year. However, the BICEP team apparently interpreted the map as showing only the galactic emissions. In reality, it may also contain the largely unpolarized hazy glow from other galaxies, which has the effect of making the galactic microwaves coming from any particular point of the sky look less thoroughly polarized than they actually are. So using the map to strip out the galactic foreground may actually leave some of that foreground in the data where it could produce a spurious signal, Falkowski explains. "Apparently, there is something that needs to be corrected, so at this point the BICEP result cannot be taken at face value," he tells *Science*.

BICEP researchers are not ready to concede the point, however. Clement Pryke, a cosmologist at the University of Minnesota, Twin Cities, and a co-principal investigator for the BICEP team, acknowledges that the foreground map is an important and thorny issue. Part of the problem is that the Planck team has not made the raw foreground data available, he says. Instead, BICEP researchers had to do the best they could with a PDF file of that map that the Planck team presented at a conference. Moreover, Pryke says, conversations with members of the Planck team leave it uncertain exactly what is in the key plot. "It is unclear what that plot shows," he says.

As for Falkowski's suggestion in his blog that the BICEP has admitted to making a mistake, Pryke says that "is totally false." The BICEP team will not be revising or retracting its work, which it posted to the arXiv preprint server, Pryke says: "We stand by our paper."

In the end, the issue may change the path forward only slightly. Many researchers had been awaiting Planck's own mapping of the polarization of the CMB, which the Planck team intends to release in October, to see if it reproduces the BICEP result. Now, however, they may be waiting as anxiously to see Planck's final map of the galactic foreground, due out at the same time, as it could make the BICEP signal go away.