within the error bars, the point source is stationary. "We cannot reproduce what Caraveo says in the IAU circular in spite of our best efforts," Sahu told *Science*. Tavani suggests that the discrepancy is due to his own team's superior software for extracting apparent motion from the data, but the issue remains unresolved. So does the nature of the fuzzy patch. As *Science* went to press, several astronomers reported in an IAU circular that a so-far-uncorroborated measurement at the Keck 10-meter telescope indicated that the "host galaxy" might have faded, which would indicate that it isn't a galaxy at all.

Resolving these issues, says Paczyński, is likely to require a third HST observation when the point source, now drawing close to the sun, reemerges from its glow in a few months. If the object is still visible, the next glimpse of it should settle the question of whether it is moving. And finding and studying optical counterparts for several more GRBs could finally solve the mystery—providing they yield their secrets more readily than this one has. In the meantime, says Peter Mészáros, a theorist at Pennsylvania State University, "It has been a bit of a roller coaster."

–James Glanz

PHYSICS

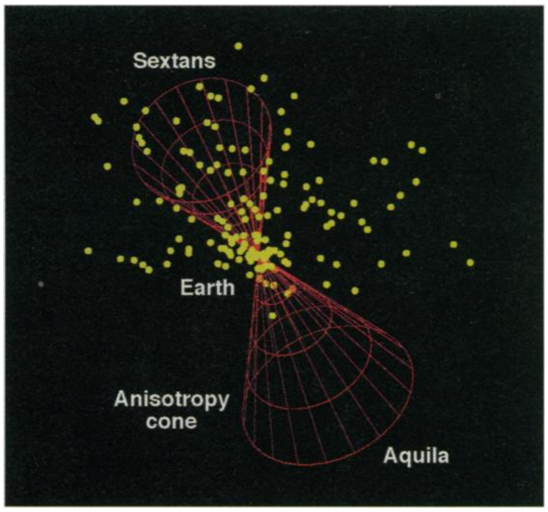
Doubts Greet Claim of Cosmic Axis

Interesting—but probably wrong. That distills the reaction of most physicists and radio astronomers to an extraordinary claim that space itself might have an overall orientation. Aired last week amid a barrage of university press releases that culminated in front-page newspaper headlines, the claim was based on unaccountable differences in the way radio waves seem to propagate to Earth from galaxies at different spots in the sky. But other researchers say that the evidence behind the claim has serious shortcomings.

Critics have not identified a single fatal error that could explain away the result, which Borge Nodland of the University of Rochester in New York and John Ralston of the University of Kansas published in the 21 April issue of *Physical Review Letters*. But astronomers say the two physicists relied on old and incomplete data, omitting perhaps 99% of recent observations of radio galaxies. Their analysis also depends on outdated ideas about the nature of the signals from those galaxies, says Kenneth Chambers of the University of Hawaii. Add the likelihood that the conclusions would—just for starters—overturn Einstein's theory of relativity, and other researchers are deeply skeptical. Michael Turner, a physicist at the University of Chicago, had one of the kinder assessments. "Extraordinary claims demand extraordinary evidence," he said. "The evidence presented does not yet meet this standard."

Ralston says he is not surprised by the criticism: "It's always going to be there as long as somebody tries something new." He and Nodland analyzed published observations of 160 radio-emitting galaxies scattered around the sky. The electric field in radiation from such galaxies often arrives at Earth with a distinct polarization, or orientation, like the silhouette of a baton held against the night sky. Nodland says he and Ralston thought data on these polarizations could provide a test of whether "certain [arrival] directions are special compared to other directions."

Like a baton hurled into the air, the polarization of radio waves rotates as they travel through space. Part of the rotation can be explained by the so-called Faraday effect, which results when the waves interact with charged particles and magnetic fields in space. Because the effect varies with frequency, Nodland and Ralston tried to estimate the Faraday rotation between Earth and any given radio galaxy by comparing the polarization of the signals at different frequencies.



Universe with an attitude? A new analysis suggests that the polarization of radio waves rotates the most when they arrive from particular directions.

They then tried to estimate the signals' original polarization by assuming that each galaxy emits radio waves polarized at a specific angle relative to observed structures, like the energetic jets of plasma seen emanating from many radio galaxies. They subtracted the Faraday rotation from the polarization observed at Earth, then compared the result with their estimate of the original angle. The procedure revealed a residual twist—one that varied with the distance of the galaxy and its direction. The twist was greatest for galaxies lying near a single axis in the sky, running roughly in the direction of the constellation Sextans.

That conclusion ended up making headlines last week after unrelenting promotion by the two universities' press offices. Its consequences would indeed be momentous. A preferred axis in space would violate physicists' cherished assumption that physical laws are the same everywhere in the universe, and it could revise cosmologists' picture of the big bang.

But it also conflicts with the best evidence cosmologists have that the universe really is isotropic, or identical in all directions: the homogeneity across the sky of the microwave background radiation generated in the big bang. And the conclusion is weakened by problems in the selection and treatment of data, say other researchers. For one thing, the bulk of Nodland and Ralston's data set consists of observations from before about 1980, when the Very Large Array (VLA) near Socorro, New Mexico, came on line and began making far better observations of radio galaxies.

For another, the assumption that each galaxy emits radio signals at a single, predictable polarization is decades out of date, says Chambers. Measurements at the VLA and elsewhere have shown that the emitted polarization varies widely over a single galaxy. Also, large and incalculable amounts of Faraday rotation often occur in the plasmas and magnetic fields near the galaxies themselves.

Responds Ralston, "People have sent me e-mail saying there are newer data. Of course, there are newer data on radio galaxies in general," but he says he didn't find any other observations that had all the features needed for his analysis. And he says the very fact that the analysis reveals a systematic variation in the twist shows the signals could not have been completely scrambled at the source.

But most researchers think the effect would simply vanish in a larger, more modern data set. "I wouldn't look at this and say there's no chance it could be right," says Ruth Daly, a physicist at Princeton University. "But it's not clear whether [the analysis is] telling us something interesting about the universe or about problems in the data."

–James Glanz