



Lawrence Krauss

Courtesy of Lawrence M. Krauss

Rumor of gravitational wave discovery is just that, source says

By [Adrian Cho](#) | Jan. 12, 2016

If you follow physics, you have likely heard the rumor by now: Physicists working with a pair of gigantic detectors have finally discovered gravitational waves—ripples in space and time set off when, say, two massive neutrons stars spiral into each other—and have only to announce it. It would be a sure-fire Nobel Prize–winning discovery and the rumor sounds plausible. Sensing those waves is exactly what a \$500 million project called the Laser Interferometer Gravitational-Wave Observatory (LIGO) was built to do. **Numerous news outlets have reported the rumor**, prompted by Twitter posts by Lawrence Krauss, a theoretical physicist and author at Arizona State University, Tempe.

There's a qualification, however: By his own account, Krauss has spoken to nobody

in the 900-member LIGO Scientific Collaboration.

"I never said I've talked to anybody in the collaboration," he tells *Science* Insider. "That's why I used the word rumor. I don't know how to be clearer."

Albert Einstein predicted the existence of gravitational waves not long after he published physicists' prevailing theory of gravity, the general theory of relativity. For decades, experimenters have been striving to detect them. Physicist working with LIGO looked for them from 2002 to 2010, with the initial incarnation of the observatory, which consists of two gargantuan L-shaped optical instruments in Hanford, Washington, and Livingston, Louisiana. ([See a video of the device here.](#)) To detect the stretching of space itself, researchers compare the lengths of an interferometer's two 4-kilometer-long arms to within a billionth the width of an atom.

From 2010 to 2015, LIGO researchers completely rebuilt their instruments, aiming to make them up to 10 times more sensitive. They resumed their hunt for a fleeting source of gravitational waves on 18 September 2015. Then the rumor mill revved up.

On 25 September 2015, Krauss tweeted: "Rumor of a gravitational wave detection at LIGO detector. Amazing if true. Will post details if it survives." That tweet elicited a flurry of news stories.

Then, **yesterday, Krauss tweeted:** "My earlier rumor about LIGO has been confirmed by independent sources. Stay tuned! Gravitational waves may have been discovered!! Exciting." Again, a press storm ensued.

From the beginning, there have been reasons to doubt that the rumor will hold up. In particular, LIGO researchers purposefully inject false signals in to their data to test the sensitivity of their analysis techniques and to keep people honest. Only a handful of people know when the fake signals are injected, and they reveal that information only at the very end of the process, after researchers have gone through all the checks to validate a signal. In fact, LIGO researchers thought they had discovered a signal on 16 September 2010, just before they shut down for the rebuild. But **it turned out to be an injected signal**, which the researchers found out only as they were about to submit for publication a paper claiming a discovery. That procedure would seem to render it impossible for LIGO researchers to know for 3 months whether they had a real signal or not.

Krauss acknowledges the point, but says that in September 2015 a prominent physicist told him that the LIGO team had spotted the signal in data from an engineering run, into which—he claims—false signals are not injected. However, that physicist is not a member of the LIGO collaboration, Krauss says, so the information is second-hand at best.

More recently, Krauss says, others have told him that the LIGO team is writing a paper and debating whether a potential signal fits the signal expected from a pair of neutron stars spiraling together or a pair of black holes spiraling together. Again, Krauss says, the sources of these additional rumors do not work within the LIGO collaboration.

Krauss has taken some blowback for his rumor-mongering. "[I]f true, you are trying

to steal their glory; if false, you are damaging scientific credibility," tweeted Michael Merrifield, an astronomer at the University of Nottingham, in the United Kingdom. Erik Mamajek, an astronomer at the University of Rochester in New York tweeted, "Does [the LIGO] project sanction your rumor-mongering? 'Confirmed' followed by 'may have been' = BS. Hurts science."

Krauss, the author of **nine popular science books** including *The Physics of Star Trek* and *A Universe from Nothing*, counters that he was merely trying key in the public to the discussions physicists are already having among themselves. "All I was trying to do was prepare people for the potential excitement," he says. "If something really excites me, should I never talk about it?"

LIGO leaders seem somewhat dismayed by whole affair. "I've seen Krauss's new tweet," wrote Gabriela Gonzalez, a physicist at Louisiana State University, Baton Rouge, and spokesperson for the LIGO Scientific Collaboration in an email. "I'm disappointed (again) that he didn't ask me or anybody in LIGO leadership."

Krauss says that he purposefully avoided trying to confirm the rumors because doing so would have been unethical. "If I contacted them, that would imply that I was trying to get information I shouldn't have," he says. "That would have been inappropriate." Krauss adds that, had he been told something by LIGO researchers in confidence, he would have kept it to himself.

For their part, LIGO researchers declined to comment on the purported signal. "We have not finished taking data yet and haven't finished reviewing analysis of results even from early in the run," Gonzalez says. "We'll certainly let you know when we have news to share." And that's no rumor.

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