

Galaxy seen blasting its neighbor

by Bend_Weekly_News_Sources

In a never-before seen event, a powerful jet from a galactic giant, central black hole is pummeling a nearby galaxy, according to astronomers. The beam may profoundly disturb planets in its path and later trigger a burst of star formation, they said.

A composite image from several observations shows what astronomers say is a jet from a black hole at the center of a galaxy, striking another galaxy. The beam is difficult to see in the area where it emerges, from the bright zone in the middle of the large galaxy at lower left. It becomes more apparent where astronomers say it is striking the second galaxy, to the upper right of the first one. There, it creates what appears as a blue spot in on the lower right of the smaller galaxy. Continuing onward to the upper right of the picture, the remnants of a beam appear disrupted and deflected, releasing a vast wisp of smoke. This is similar to the way a stream of water from a hose will splay out after hitting a wall at an angle, researchers explain. In the image, data from several wavelengths of light have been combined: X-rays from Chandra (colored purple); optical and ultraviolet data from the Hubble Space Telescope (red and orange); and radio emission from the Very Large Array (VLA) and MERLIN (blue) telescopes. (Image credit: X-ray: NASA-SA/CXC/CFA/D.E. et al.; Optical/UV: NASA-STScI; Radio: NSF/VLA/CFA/D.Evans et al., STFC/JBO/MERLIN)

NASA's Chandra X-ray Observatory, the researchers explained, has revealed that both galaxies "orbit" each other in a system called 3C321 "have central supermassive black holes. The smaller galaxy, astronomers said, seems to have swung into the path of a beam coming from the black hole of the larger galaxy. "We've seen many jets produced by black holes, but this is the first time we've seen one punch into another galaxy," said Dan Evans, a scientist at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. and leader of the study. "This jet could be causing all sorts of problems for the smaller galaxy. Black holes are objects so dense that their gravity sucks in anything that comes too close, including light. But some nearby material does not fall inside the black hole, and instead gets ejected in beams, a phenomenon believed to result from magnetic fields. The largest black holes are thought to lurk at the centers of galaxies. Jets from these are found to produce copious radiation, especially powerful X-rays and gamma-rays, which can be deadly in large quantities. The combined effects of this radiation and particles traveling at near-light speed in the beam could severely damage planetary atmospheres in the jet's path, astronomers say; for instance, protective layers of ozone in the upper atmosphere could be destroyed. Supermassive black hole jets carry torrents of energy far from their origin, and understanding them is a key goal for astrophysicists. "We see jets all over the universe, but we're still struggling to understand some of their basic properties," said co-investigator Martin Hardcastle of the University of Hertfordshire in the U.K. The new finding "gives us a chance to learn how they're affected when they slam into something like a galaxy and what they do after that." The effect of the jet on the companion galaxy is probably substantial, researchers said, because the galaxies are very close by astronomical standards "about 20,000 light years apart. A light-year is the distance light travels in a year. They lie about the same distance apart as Earth is from the center of our galaxy. The so-called "death star" galaxy in 3C321 was discovered using both space and ground-based telescopes, researchers said. A bright spot in radio telescope images, they remarked, shows where the jet has struck the side of the galaxy. A unique aspect of the finding, they added, is how short-lived the event is in cosmic terms: they estimate the jet began hitting the galaxy a million years ago, a small fraction of the system's lifetime. This would suggest the alignment is rare in the universe. But the event may not be all bad news for the

vicinities of the galaxy, they added: the huge influx of energy and radiation could prompt many stars and planets to form in the debris wake. The findings are to appear in the research publication Astrophysical Journal.

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