that their states might be frozen out.

Despite the setback, Texas A&M says it is ready to compete for the center. And congressional aides note that DeLay and other Texas lawmakers could still earmark money for the project in a spending bill. Says one Republican staffer: "The idea that this is going away is absurd." Adds another aide, who is opposed to the project, "This is like a horror movie: The creature takes a licking but somehow keeps on ticking."

–DAVID MALAKOFF

ASTRONOMY

X-rays Show a Galaxy Can Have Two Hearts

Astronomers have sighted evidence of two black holes spiraling toward an eventual collision in the center of a nearby galaxy. The discovery—made by an international team of astronomers using data from the orbiting Chandra X-ray Observatory—has confirmed astronomers' long-held suspicions, based on indirect evidence, that the black holes at the hearts of many galaxies might come in pairs.

"It was not a surprise. … We have been thinking about it for more than 20 years," says Astronomer Royal Martin Rees of the University of Cambridge, U.K. In 1980, Rees, together with Mitchell Begelman of the University of California, Berkeley, and Roger Blandford of the California Institute of Technology in Pasadena, proposed that the waltz of binary supermassive black holes at the centers of some galaxies explains why jets of energy spewing from the galaxies sometimes wander, or precess. But their ideas have remained speculative until now.

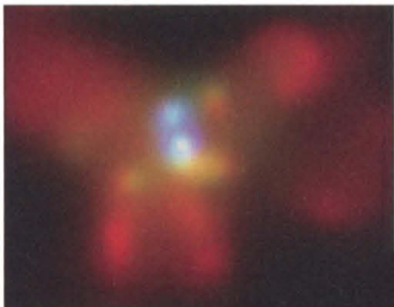
The galaxy that harbors the double black hole NGC 6240 lies 400 million light-years from Earth. "Ever since its discovery, it has received a lot of attention," says team member Stefanie Komossa, an astronomer at the Max Planck Institute for Extraterrestrial Physics in Garching, Germany. In 1983, astronomers observing NGC 6240 in visual light found that its shape is strongly distorted—an indication that it consists of two galaxies that have collided. What really piqued their curiosity, however, was that the galaxy radiated enormous amounts of power at longer wavelengths, in the infrared part of the spectrum.

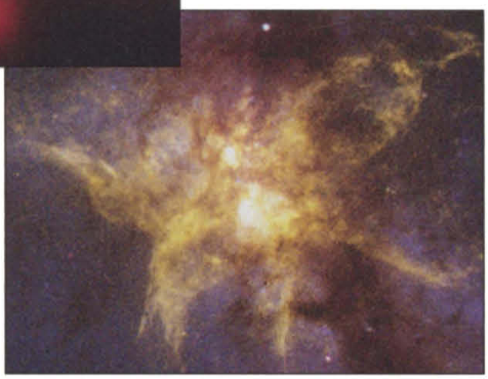
Astronomers knew of only two mechanisms that might explain such huge infrared emissions. NGC 6240 might be alive with starbursts, swarms of newly forming stars. Alternatively, like many other galaxies, it might contain an active galactic nucleus (AGN): an enormous engine that blasts out x-rays as matter falls toward a black hole in the galaxy's center. Dust clouds near the core of the galaxy would absorb x-rays and reradiate the energy in the infrared.

When Chandra was launched in 1999, its high-resolution x-ray imaging made NGC 6240 an obvious target, Komossa says. She and her colleagues set out to find the galaxy's x-ray powerhouse. Earlier observations by the ROSAT x-ray observatory, which Germany, the U.K., and the U.S. operated during the 1990s, had hinted that the galaxy's central x-ray source was oblong rather than spherical. In 10 hours of observations made in July 2001, Komossa's team found that the elongated source was actually two sources, thousands of light-years apart.

Several telltale signs show that the x-ray sources are black holes, Komossa says. First, they are very intense and concentrated, and they are emitting extremely high-energy x-rays—hallmarks of AGNs but not of starbursts. What's more, the spectrum of x-rays from the galaxy's center shows a strong emission line caused when cold, nonionized iron atoms absorb and release energy. Starbursts don't make iron fluoresce that way, but highly energetic x-rays from AGNs do.

The researchers estimate that each black hole has a mass between 10 million and 100 million times that of our sun. The distance between them, 3000 light-years, means that they must rotate around their common center over a period of millions of years. Over hundreds of millions of years, the two bodies will spiral toward each other, giving off energy in the form of gravitational waves, and ultimately merge. Such mergers might explain why some galaxies don't show an increased concentration of stars toward the center, Rees says: "In the process of merging, the binary would have kicked out the stars from the center."





Twin peeks. X-ray image (*top*) reveals two black holes at the core of a galactic merger.

CREDITS: (X-RAY, LEFT) NASA/CXC/MPE/S. KOMOSSA *ET AL.*; (OPTICAL, RIGHT) NASA/STSCI/R. P. VAN DER MAREL AND J. GERSSEN

Gravitational waves unleashed by similar mergers should be detectable by the Laser Interferometer Space Antenna, a constellation of six spacecraft that the European Space Agency and NASA plan to launch later this decade (*Science*, 16 August, p. 1113). Because most galaxies are expected to contain supermassive black holes, and many galaxies merge, coalescent black holes might be common. "We may observe about one merger per year if we observe all the galaxies out to the limit of a big telescope," Rees says.

–ALEXANDER HELLEMANS

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PLANETARY ORIGINS

A Quickie Birth for Jupiters and Saturns

Talk about a major embarrassment for planetary scientists. There, blazing away in the late evening sky, are Jupiter and Saturn—the gas giants that account for 93% of the solar system's planetary mass—and no one has a satisfying explanation of how they were made. Of course, they formed from the infinitely more diffuse gas and dust of the solar nebula as the sun formed. But what could entice that much gas to condense into planets before it all dispersed in a million years or so?

On page 1756, a group of astrophysicists presents computer simulations of the nascent solar system that suggest a possible mechanism: runaway fluctuations in the disk's density. In their model, gas giants of about the right size, number, and orbit condense from a disk of gas to look like very young Jupiters. The trick was to simulate the process in fine detail so that the gas's own gravity could take over. "It's a beautiful calculation," says astrophysicist Richard Durisen of Indiana University, Bloomington. "It's a step along the way, but this is not the final answer." A next step is to work out whether some disruptive forces not yet included in this model might frustrate the disk's gravitational urge to collapse on itself and spawn planets.

Until recently, theorists assumed that, for a gas giant to form, a small core of rock with the mass of perhaps 10 Earths must accumulate bit by bit as kilometer-size planetesimals collide with one another. Only then would the core have the gravitational heft to begin pulling in the gas that would make up 99% of the planet. But in the meantime, the spinning protoplanetary disk is dispersing quickly. By current estimates, it's gone before a Saturn can grow, much less a Jupiter. But the alternative to accretion is even less appealing: Depend on a patch of slightly denser gas