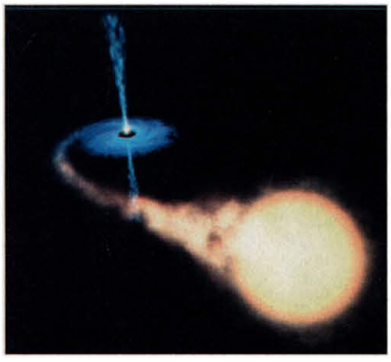
Speeding Black Hole



Artist's impression of black hole whose enormous gravity sucks material from companion star.

Astronomers have clocked a black hole with a mass six times that of the sun racing through the flattened disk of the Milky Way galaxy at some 400,000 km/h. According to Félix Mirabel of the French Atomic Energy Commission in Saclay, the dizzying speed beautifully confirms the theory that black holes are the remains of detonated stars. "I can't explain such a high velocity in any other way," he says.

Black holes are thought to form when the dense core of an exploding massive star, or supernova, collapses. If, as in this case, the supernova is orbiting a companion star, its corpse can be kicked away violently.

Mirabel and his colleagues detected the motion of this black hole by measuring the position of its dim companion star in 1996 and again in 2001 using the Hubble Space Telescope, they report in the 19 November issue of *Astronomy & Astrophysics*. Last year, astronomers found another speedy black hole, but that object resides in the Milky Way's extended halo, where high velocities are the rule. In contrast, this one, known as GRO J1655-40, moves four times as fast as neighboring stars.

The team's goal is to trace stellar corpses back to their origins, which in this case could be anywhere between 3000 and 10,000 light-years away. Gijs Nelemans of Cambridge University in the U.K. says the find will help astronomers understand the forces that send the holes flying through space. Astronomers have found high "natal kick" velocities for some neutron stars but never for black holes, which are more massive.

World's Fastest Supercomputers

Rank	Name	Location	Teraflops
1	NEC Earth Simulator	Earth Simulator Ctr., Japan	35.86
2 & 3	Hewlett-Packard ASCI Q	Los Alamos Natl. Lab., U.S.	7.73
4	IBM ASCI White	Livermore Natl. Lab., U.S.	7.23
5	Linux NetWorX	Livermore Natl. Lab., U.S.	5.69
6	HP AlphaServer SC	Pittsburgh Supercomp. Ctr., U.S.	4.46
7	HP AlphaServer SC	Atomic Energy Commission, France	3.98
8	HPTi	Forecast Systems Lab., U.S.	3.34
9	IBM pSeries 690	HPCx, U.K.	3.24
10	IBM pSeries 690	Natl. Ctr. for Atmos. Research, U.S.	3.16

Japan's Earth Simulator remains the world's undisputed supercomputing champ, running at nearly five times the speed of its closest competitor, according to a semiannual list compiled by TOP500, a ranking group (www.top500.org). Rankings will be changing, however: The U.S. government last week announced that it will spend $250 million to buy two IBM machines that will have a combined peak processing speed of 467 trillion calculations per second (teraflops)—more than the combined processing power of the existing 500 fastest machines.

Toys by Future Engineers

Smith College in Northampton, Massachusetts, is one of the few colleges that has remained all-female. A further claim to distinction is its recent establishment of an engineering school. Now Smith is coming up with ideas to get more girls into engineering, the latest being a "toy challenge" it's sponsoring with astronaut Sally Ride.

Engineering professor Domenico Grasso says it all started when, instead of making his beginning students design a toaster or an electrical circuit, he assigned them to come up with educational experiments for middle school kids. The college has now teamed with Ride and her Science Club—an educational effort—as well as toymaker Hasbro to sponsor a toy competition for middle-schoolers, especially girls.

Teams competing in the "Toy Challenge" have to be at least 50% girls. "This is a great way to get across basic principles of design, and get them engaged early!" Ride e-mailed *Science*. The final deadline for applications is 13 December. For more information go to ImaginaryLinesInc.com.

Where the Girls Are

When insects target a leaf for a meal or to lay eggs, plants can respond with chemical defenses. Now researchers say they've found a wasp in which females can change the host plant's chemistry for sexual purposes.

Female wasp laying eggs.

Each summer, the wasp *Antistrophus rufus* lays its eggs inside the stems of 4-meter-tall flowering compass plants on the Illinois prairie. In spring, males emerge first and go looking for the still-slumbering females.

John Tooker of the University of Illinois, Urbana-Champaign, and colleagues wondered how males locate the plants with the concealed females. The team found that plants hosting female larvae had different chemical compositions than those that didn't. It appeared that the females were altering the ratios of monoterpenes, chemicals that generate the plant's smell. The researchers then exposed male wasps to filter paper soaked in compounds taken from plants harboring females. The wasps excitedly waved their antennae over the treated paper while ignoring untreated paper, the team reported online last week in the *Proceedings of the National Academy of Sciences*.

Ian Baldwin, director of Germany's Max Planck Institute for Chemical Ecology, says the study is the first to identify an insect that manipulates plant chemistry for sexual signaling.

But to really nail down the case, Joachim Ruther and Monika Hilker of the Free University of Berlin suggest, the researchers should also test male wasps' reactions to the smell of stems that didn't harbor females.

CREDITS: (TOP TO BOTTOM) ESA/NASA/F. MIRABEL; JOHN TOOKER; SMITH COLLEGE