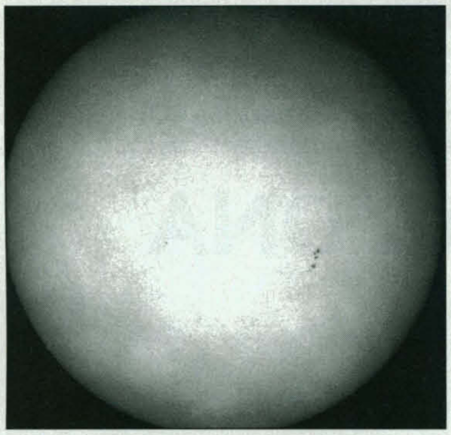


First light, again. An early image from SOHO's restored Michelson Doppler Imager.

Dalsgaard of Århus University in Denmark, a SOHO co-investigator.

Ground engineers reestablished contact with the spacecraft in August and painstakingly worked to slow its spin and recharge its batteries. On 25 September, they succeeded in taking the spacecraft out of its "safehold" mode—a safety position that keeps its arrays pointing toward the sun—and restored SOHO's high-precision pointing mode, in which its attitude is maintained by spinning reaction wheels and controlled by a fine-pointing sun sensor and a star tracker.

On 5 October, the first instrument was powered up—the Scanning Ultraviolet Spectrometer. The Variability of Irradiance and Luminosity Oscillations instrument was switched on the next day. "All the data we have seen up to now look very good," says principal investigator Claus Fröhlich of the Physical Meteorological Observatory of the Davos World Radiation Center in Switzerland.

The interruption of data taking was a setback for researchers studying the long-term oscillations of the sun, however. "We are still searching for the g-modes, the gravity modes, and the longer the time series, the better the signal-to-noise [ratio]," says Fröhlich. Although time has been lost, astronomers who spoke with *Science* are unanimous in praise for the Goddard recovery team, which has been toiling 7 days a week since June. "It is a major success … following a major failure," says Christensen-Dalsgaard. –ALEXANDER HELLEMANS

Alexander Hellemans is a writer in Naples, Italy.

ASTRONOMY

Planet Hunters Become Weight Watchers

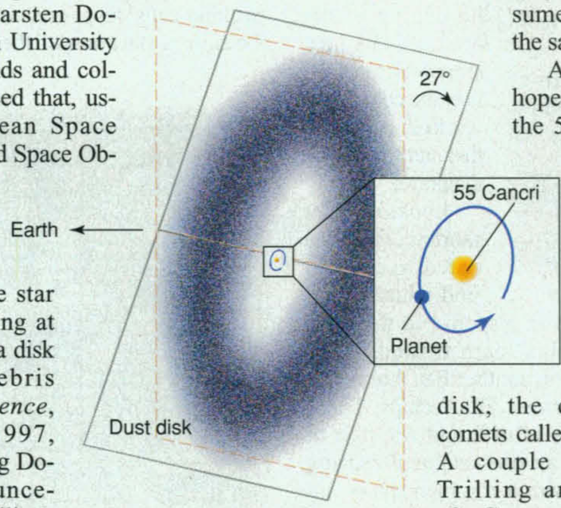
It's official: The invisible object tugging on a star in the constellation Cancer is a planet. Although it is 3 years since astronomers first detected the telltale wobble in a nearby star, indicating an unseen companion, they could not rule out the possibility that it is a dim star or brown dwarf instead of a planet. The same doubt has accompanied every one of the dozen or so planet candidates detected since then. But by imaging a flattened disk of dust particles surrounding one of those candidate planetary systems, two Arizona astronomers were able to deduce, for the first time, the mass of a suspected planet. The object is, they calculate, less than twice the mass of Jupiter—far too light to be a star or a brown dwarf.

Astronomers can detect invisible, low-mass companions around other stars by finding tiny periodic changes in the line-of-sight velocity of the parent star as the companion tugs it back and forth. But it is impossible to deduce the true mass of such objects from the stellar wobbles, because astronomers do not know the orientation of the companions' orbits with respect to the line of sight. The same radial-velocity variations in a star could be caused by a relatively low-mass planet in an edge-on orbit, or a heftier object—a brown dwarf, say—in an orbit at a steep angle to the line of sight.

Last year, Carsten Dominik of Leiden University in the Netherlands and colleagues announced that, using the European Space Agency's Infrared Space Observatory, they had detected an excess of far-infrared radiation from the star 55 Cancri, hinting at the existence of a disk of dust and debris orbiting it (*Science*, 5 December 1997, p. 1707). Hearing Dominik's announcement, David Trilling and Robert Brown of the University of Arizona, Tucson, realized they had a rare opportunity. The star was also known to have a possible exoplanet companion, discovered in 1996 by Geoff Marcy of San Francisco State University and Paul Butler of the Anglo-Australian Observatory in New South Wales. And Trilling and Brown had scheduled an observation of 55 Cancri the following week, using an instrument called CoCo (for cold coronagraph) at NASA's 3-meter Infrared Telescope Facility (IRTF) at Mauna Kea, Hawaii. CoCo is designed to observe cool objects such as clouds of dust. By imaging the disk around 55 Cancri, Trilling and Brown hoped to learn its orientation, and hence the orientation of the planet's orbit.

A week later, Trilling and Brown blocked out the star's own infrared glare to reveal a flattened disk of cool dust extending to at least 6 billion kilometers from the star. The infrared image implied that the disk is tilted 27 degrees from the plane of the sky. Assuming that the planet around 55 Cancri (which is much closer to the star) orbits in the same plane, its mass could be calculated from the wobbles Marcy and Butler originally measured. This week, Trilling and Brown announced their results, including an estimated mass of 1.9 Jupiters, at the American Astronomical Society's Division of Planetary Sciences meeting in Madison, Wisconsin; a paper is due to appear in *Nature* next week.

Trilling admits that he cannot prove the crucial assumption—that the disk and the planet orbit in the same plane. "But it would be a very strange dynamical system" if they were not in the same plane, he says. Dominik agrees. "All theories I know about the formation of planets around [sunlike] stars start with a disk around the star, and the planets are formed in that disk. I think it is very reasonable to assume that both are in the same plane."



Telltale tilt. The inclination of 55 Cancri's disk reveals its planet's mass.

Astronomers now hope to learn whether the 55 Cancri system is one of a kind, or whether other exoplanetary systems have disks that may betray their mass. Omens are good—after all, our sun has its own disk, the distant band of comets called the Kuiper belt. A couple of weeks ago, Trilling and Brown used CoCo again to observe a number of other stars thought to be accompanied by planets. Although he does not want to disclose any results yet, Trilling says that they found one or two more dust disks. "We expect that most systems with planets also have disks," he says.

Details of masses would tell us if other planetary systems are like our own; hence, other astronomers are on the lookout. Jane Greaves of the Joint Astronomy Center in Hawaii, who discovered a disk around the nearby star Epsilon Eridani (*Science*, 10 July, p. 152), says, "We haven't yet tried to image dust around [known exoplanet stars], but we're planning a project for early next year." It surely won't be long before other exoplanets are put on the dust-disk weighing scales. –GOVERT SCHILLING

Govert Schilling is an astronomy writer in Utrecht, the Netherlands.

CREDIT: (TOP) NASA