ASTRONOMY

Gamma Blast From Way, Way Back

COLUMBUS, OHIO—A blast of gamma rays picked up by satellites last December originated 10 billion years ago at the very edge of the visible universe, observers reported here last Sunday. The event was a gamma ray burst, a flash of high-energy radiation that occurs roughly once a day at a random point in the sky. In just the last year, astronomers have learned that these flashes originate in distant galaxies, implying that their sources are the most energetic events in the universe. But the spectacular distance of this event could force theorists to come up with still more energy to stoke the mysterious bursts.

At a meeting of the American Physical Society, Shrinivas Kulkarni of the California Institute of Technology described how he, his Caltech colleague George Djorgovski, and others used the 10-meter Keck Telescope in Hawaii and NASA's Hubble Space Telescope to study a fuzzy patch of light at the site of a 14 December gamma ray burst. By making a spectrum of the fuzzy patch, presumably the galaxy in which the original explosion took place, Kulkarni and Djorgovski were able to measure its "redshift"—the stretching of its light by the universe's expansion, which is a measure of distance. The result, detailed in a paper accepted at *Nature*, is a redshift of 3.418. That puts the source at a distance several times greater than the only comparable measurement, a figure of 0.835 or more for another burst's optical counterpart (*Science*, 23 May 1997, p. 1194). Kulkarni declined to elaborate on the finding until his paper appears.

"It's just spectacular," says Princeton University astronomer Neta Bahcall. "This is almost at the fringes of anything observed in the universe," says Jonathan Katz, an astrophysicist at Washington University in St. Louis. "The farther away [the bursts] are," he adds, "the more energy they require" to explain their observed brightness, which could make the new measurement "a bit frightening to theorists."

A cascade of observations at different wavelengths led to the discovery. Gamma ray detectors can't accurately pin down the location of a burst, but the cameras aboard the Italian-Dutch BeppoSAX satellite spotted the x-ray afterglow of the 14 December event and determined a relatively accurate position for it. That allowed other astronomers to find a fading optical counterpart. Once the fading leveled off—suggesting that the light of the host galaxy was emerging—Kulkarni used the Keck to find the galaxy's emission spectrum and measure its redshift. More recently, he photographed the tiny patch of sky with the Hubble. The image shows what appears to be a faint, elongated galaxy containing a point of light, probably the fading ember of the original explosion.

Many theorists believe that a gamma ray burst is the first flash from a violent fireball, perhaps triggered by the collision of two neutron stars. The fireball then loses steam, producing fading counterparts at progressively longer, lower energy wavelengths—x-rays, visible light, and radio waves. But the titanic energy implied by this latest measurement could send theorists looking for ways to squeeze more brilliance from the fireball.

Katz and many others have already proposed that the energy from an outburst can be channeled in a particular direction, perhaps by magnetic fields. If an explosion happened to be pointed toward us, it would look brighter for a given energy. If so, Earth may have been caught last December in a gamma ray searchlight from across the universe.

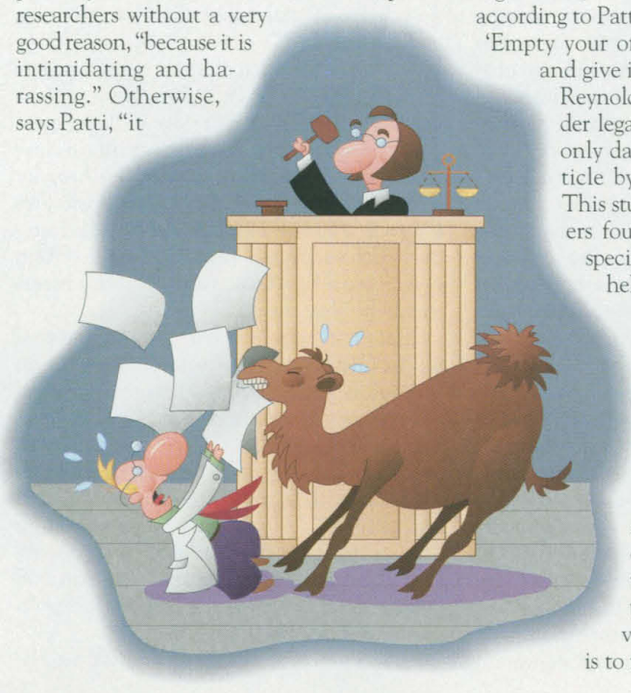
–James Glanz

RESEARCH CONFIDENTIALITY

UC Fights Tobacco Company Subpoena

The tobacco companies are asking Congress to declare a truce in the legal war over smoking, but at the same time they are waging some pitched battles in the states over the control of scientific files that could be important in anti-smoking lawsuits. In March and April, for example, R. J. Reynolds Tobacco Company of Winston-Salem, North Carolina, maker of Camel cigarettes, obtained two subpoenas demanding broad access to the files of cancer epidemiologist John Pierce of the University of California (UC), San Diego. He co-authored a study published in the 18 February *Journal of the American Medical Association* (JAMA) that links cigarette advertising and teenage smoking. On 20 April, university lawyers filed their latest response in a state court in San Diego, arguing that Pierce should not be compelled to surrender all the raw data Reynolds has demanded.

UC counsel Christopher Patti says the university is making a novel argument in this case. "In the past, we have been more concerned about the need to protect unpublished data" from premature release through court actions. But now that subpoenas have become a "routine tactic by the industry," says Patti, "we are more concerned about the broader issue of chilling research" in controversial areas. In briefs that aim to block subpoenas of Pierce in two separate lawsuits in state courts, Patti says, UC is arguing that companies "just should not be allowed" to subpoena researchers without a very good reason, "because it is intimidating and harassing." Otherwise, says Patti, "it means that if you want to do tobacco research, you've got to have a lawyer" on tap.



TERRY E. SMITH

R. J. Reynolds's initial subpoena sought everything in Pierce's files relating to tobacco advertising, marketing, or promotion—including memos, letters, and electronic messages, according to Patti. They "basically told Pierce, 'Empty your office into a bunch of boxes and give it to us,' " he says. Since then, Reynolds has narrowed its request under legal challenge, agreeing to seek only data supporting the JAMA article by Pierce and his colleagues. This study of 1752 California teenagers found that cigarette ads—and specifically "Joe Camel" images—helped get nonsmoking teenagers hooked on cigarettes.

Pierce views this kind of subpoena, even if it fails, as "personal harassment." He says he is fortunate to be defended by UC's legal team, which has successfully argued against broad subpoenas in the past. According to Pierce, other institutions have not been willing to defend their researchers as vigorously. The effect, he says, is to force authors of controversial

studies to waste time organizing their own defense or get out of the field.

Physician Joseph Fischer agrees. In 1993, he left the Medical College of Georgia in Augusta and quit research after his university failed to defend him from a broad tobacco company subpoena. Fischer was the author of one of three articles in *JAMA* in 1991 that tracked the use of Joe Camel ads and trends in teenage smoking (*Science*, 19 June 1992, p. 1620). Reynolds demanded access to all the authors' records, even though Fischer says he and another author were not cited in litigation and did not testify as expert witnesses. Fischer says he had to raise funds for his own defense and that after an initial victory, he lost. The court ordered him to surrender everything in his files, deleting only the names of the children he had interviewed. "I considered it unethical" to make the data public, he says, and "it became untenable for me to serve on the faculty any longer." He is now in private practice.

The tobacco industry, however, says it needs access to research records in order to defend itself against litigation. Reynolds spokesperson Peggy Carter says the company "feels we have a right to see and understand the underlying data" from a study that may be used against the company. "Often, the information that is not reported is as significant as what is reported," Carter says. She adds that she regards Pierce as an antismoking advocate of long standing.

In addition, Carter points out, Pierce has served as an expert witness in earlier suits against the industry. He has also been named an expert witness by plaintiffs in a pending case in which 18 cities and counties are suing in state court to halt certain cigarette ads on grounds that they violate state laws against endangering the health of minors. These local agencies—joined by state chapters of the American Heart Association, the American Academy of Pediatrics, and other health groups—intend to cite data from Pierce's *JAMA* article to support their case, and they plan to ask Pierce to testify. In light of this, Reynolds sees nothing wrong in subpoenaing Pierce's records.

Patti agrees that it is fair to subpoena some records of people who serve as expert witnesses. But he notes that in the state suit, Reynolds has jumped the gun on the 15 June starting date set by the court for collecting data from expert witnesses. At present, Pierce is just another scientist, he claims. Besides, Patti says, universities need to challenge the industry's attitude, which he describes as: "If you do research we don't like, you're an adversary, and if you're an adversary, you're fair game." UC expects to learn whether its challenge has succeeded in a state court hearing scheduled for 8 May.

–Eliot Marshall

LIFE AND MICROGRAVITY SCIENCES

Research Drought Looms After Neurolab Mission

KENNEDY SPACE CENTER, FLORIDA—Museums in Washington, D.C., and Bremen, Germany, are already preparing to display segments from the first reusable laboratory in space, now orbiting Earth as the Neurolab mission aboard the space shuttle Columbia. Neurolab is the last scheduled flight in the 15-year-old Spacelab program, and its demise threatens to turn the business of conducting lab experiments in space into a museum piece as well: Over the next few years, until the yet-to-be-built international space station is ready for use, opportunities for such research will be few and far between.

"It's an absolutely major problem," says Mary Jane Osborn, a biologist at the University of Connecticut, Farmington, who also chairs the National Research Council's space biology panel. "If there are no flights for 5 years, the community is going to evaporate." That worry is shared by Europeans, who spent more than $1 billion to build Spacelab. "It's a very grave danger," says Guenther Seibert, chief of the European Space Agency's microgravity and space station utilization effort. "NASA doesn't have money for more Spacelab missions, and we don't have money for new payloads." NASA insists it can cobble together enough flight opportunities to tide researchers over until the station is ready. In the meantime, a debate rages over whether such expensive flights provide good scientific value for the money.

NASA

Museum-bound. The current Neurolab mission—shown here in preparation and launch—is the last scheduled Spacelab mission.

Spacelab was born in the 1970s as the European contribution to NASA's space shuttle effort and made its debut in 1983. The lab is actually a suite of hardware that fits into the space shuttle's payload bay, providing either an open pallet for experiments or a pressurized laboratory in which astronauts can conduct research. Spacelab missions have been chosen by discipline as well as by nation, with Japan and Germany flying their own wide range of experiments. Neurolab, for example, carries neurological and behavioral experiments from Europe, Japan, and Canada, and U.S. agencies such as the National Institutes of Health (NIH), the National Science Foundation, and the Office of Naval Research.

Although Spacelab was built for 50 missions, its life was cut short after NASA agreed in 1993 to work with Russia in using the Mir station for space research. That decision forced the cancellation of several missions, leaving Neurolab as its 22nd payload. Unfortunately for scientists, the aging Mir, with its constant maintenance troubles and lack of sophisticated scientific equipment, proved to be an unhappy alternative. Now an even leaner future looms, thanks to an ailing Mir that is less hospitable to science, the shuttle's preoccupation with construction of the space station, and the squeeze on the U.S. and European space programs.

NASA officials paint a somewhat brighter picture. "We're not just going to send out a bunch of pink slips when Spacelab is over," says Frank Sulzman, acting deputy director of NASA's life and microgravity sciences program. A shuttle mission is planned for later this year that includes lab space aboard a privately financed module called Spacehab, with a second flight slated for 2000. And Arnauld Nicogossian, NASA's director of life and microgravity sciences, argues that the present community of life and microgravity scientists could even expand by using sounding rockets and ground-based methods such as drop towers and parabolic airplane flights.

A major stumbling block for conducting experiments in space, however, is money. Crewed missions are notoriously expensive—