of it reached Earth. The resulting "microlensing" may have given scientists their first direct evidence that gamma ray bursts (GRBs) blow fiery bubbles into the cosmos.

"This is an amazing confirmation of a surprising prediction," says astronomer Peter Garnavich of the University of Notre Dame in Indiana, part of the team that made the discovery. To prove it, though, Garnavich and colleagues must show that the lensing star exists, and that won't be easy.

About once a day, a sudden explosion of gamma rays pours down on Earth from a random corner of the universe. Theorists believe the initial explosion powers an expanding spherical shock wave that crashes into the surrounding gas at nearly the speed of light. The collision lights a cosmic fire at the sphere's surface that, if you could see it, would look like a glowing ring. As the wave expands and the fire fades, the afterglow changes "color" from x-ray to optical light to radio wave. Although a worldwide network of telescopes has captured the rapidly fading glow of about 20 bursts in the past 3 years, none has seen the predicted ring of fire. That's no surprise, theorists say; such a ring would be at least 1 million times too small to resolve with the most powerful telescopes.

Last March, the gamma ray burst GRB000301C changed all that. The burst occurred about 10 billion light-years away, in the constellation Corona Borealis. Routine follow-up observations with radio and optical telescopes caught an unexpected sudden brightening in the afterglow's otherwise smooth fade-out. "Since gamma ray bursts are usually so well behaved, this really stood out," says radio astronomer Dale Frail of the National Radio Astronomy Observatory in Socorro, New Mexico. Frail and his colleagues speculated that the shock wave brightened when it overtook a lump of interstellar gas.

Then, a closer look at the compiled radio and optical frequency data by Garnavich and by Kris Stanek of the Harvard-Smithsonian Center for Astrophysics (CfA) in Cambridge, Massachusetts, turned up a surprise: Within the small observational uncertainties, brightness increased evenly at all frequencies. Shock waves colliding with interstellar gas rarely produce such achromatic changes. Instead, Garnavich, Stanek, and CfA astrophysicist Avi Loeb argue in a paper accepted for publication in the *Astrophysical Journal Letters*, part of the expanding ring must have passed behind a star located exactly between Earth and the ring itself. When that happened, the star's gravity would have focused the light from the ring, bending each frequency by the same amount while increasing the intensity by a factor of 2—precisely as Loeb and his student Rosalba Perna had predicted in a 1998 paper. The duration of the flare-up implies that the width of the ring is between 7% and 20% of its radius, Stanek says.

The data are too sparse to prove unambiguously that microlensing caused the curious brightening of GRB000301C, Frail says, and there is no way to go back and get more. "Gamma ray bursts are a one-shot deal," he laments. Help may come from the HETE-2 orbiting GRB observatory, scheduled for launch on 7 October, which is expected to spot dozens of new afterglows a year. With more observations, says Princeton astrophysicist Bohdan Paczyński, GRB microlensing may become as well established as so-called galactic microlensing, in which one star brightens achromatically as it passes behind another. "At first, everyone called them *candidate* microlensing events," Paczyński says. "But after many more were discovered, they stopped saying 'candidate.'"

–MARK SINCELL

Mark Sincell is a science writer in Houston.

DEPARTMENT OF ENERGY

Science Wins Out in Latest Budget

Science has emerged a winner in this year's struggle over the Department of Energy's (DOE's) budget, erasing fears earlier this summer of severe cuts in several high-profile programs. Congress this week gave the agency's civilian science programs a 13% boost, to $3.2 billion, slightly more than the Administration had requested. The $24 billion bill also includes the extra cash needed to keep the world's largest laser project on track and restores funds that the directors of DOE's national laboratories can award to hand-picked projects. Even a threatened veto by President Clinton due to an unrelated issue is not expected to alter the research numbers.

Such an upbeat result seemed unlikely just a month ago, after both the House and the Senate approved budgets that would have punched major holes in research programs at DOE, the federal government's third-largest funder of basic research. The House, for instance, had severely cut funding for the Spallation Neutron Source (SNS), a $1.2 billion materials science accelerator that DOE is building at the Oak Ridge National Laboratory in Tennessee. The Senate, in turn, fully funded the Administration's $279 million request for SNS, but only by cutting the budgets for high energy and nuclear physics. The shortfalls prompted an all-out lobbying push by a coalition of university presidents and scientific societies.

That campaign, along with projections of a growing federal budget surplus, convinced legislators to match or exceed the Administration's request in nearly every field. The spallation source received its full request. A thicker wallet also paid for nearly $60 million in academic pork-barrel projects, including $3 million for a new nanotechnology research center at Notre Dame University in South Bend, Indiana, and $2 million for a Digital Millennium Center for high-speed computing at Tulane University in New Orleans, Louisiana. There is also $11 million earmarked for research in functional brain imaging at locations to be determined.

Even the troubled National Ignition Facility (NIF), a $3.8 billion laser under construction at Lawrence Livermore National Laboratory in California, escaped the ax. Responding to revelations of mismanagement and massive cost overruns, the Senate had voted earlier to deny the Administration's request for a $135 million increase this year for the megaproject, which will allow researchers to study nuclear weapons without testing them and to explore the feasibility of fusion energy (*Science*, 18 August, p. 1126). But the final bill gives NIF $200 million, just short of the $210 million request. Congress did attach some major strings, however, including a directive to commission the National Academy of Sciences to review the project, a requirement that Livermore pay for some of the overrun out of its own operating budget, and a DOE study of scaling back the project. Livermore chief Bruce Tarter said he was "very pleased" that the laser had survived.

Other lab chiefs were buoyed by the restoration of their internal grant programs, officially known as Laboratory Directed Re-

DEPARTMENT OF ENERGY

Program	2001 Request	Funding	% annual change
Office of Science	$3151	$3186	+13
High-Energy Physics	715	726	+3
Nuclear Physics	370	370	+4
Basic Energy Sciences	1016	1013	+30
Fusion Energy	247	255	+3
Biology and Environment	445	500	+15
National Ignition Facility	210*	200	NA
Spallation Neutron Source	279	279	+180

* Includes $135 million supplemental request to cover construction delays and cost overruns.

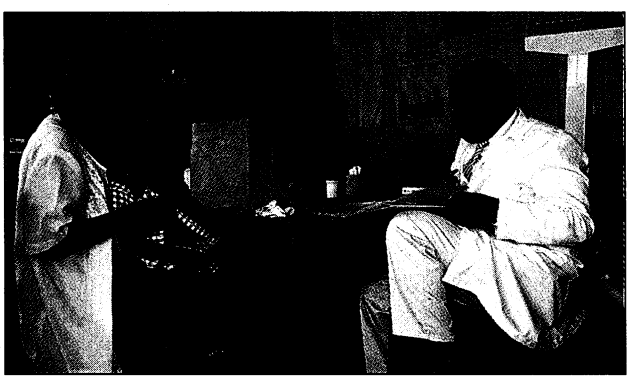
search and Development (LDRD) funds. Last year, Congress had slashed the decentralized accounts, which many labs use to seed promising research, after concerns that some labs were misusing the money (*Science*, 5 November 1999, p. 1064). But the new spending bill allows directors once again to channel up to 6% of their core budget to LDRD grants. At Livermore, that means a jump from $35 million to $52 million. "It's a big relief," says lab spokesperson Susan Houghton.

–DAVID MALAKOFF

CLINICAL TRIALS

Panel Proposes Rules For Research Abroad

Before scientists begin a clinical study in the developing world, they should make sure any successful treatment that results will be made available not just to trial participants but to the whole host country, according to a controversial recommendation from a presidential panel. The U.S. National Bioethics Advisory Commission (NBAC) on 29 September released draft guidelines* that would set this high bar for clinical research in foreign countries. NBAC took up the issue last year in response to controversies over placebo-controlled trials involving HIV-infected mothers and international trials of AIDS vaccines.



New criteria. Studying nevirapine, a drug that prevents mother-to-child HIV transmission, in Kampala, Uganda.

Ethicists and researchers have vigorously debated whether researchers from a wealthy country like the United States must provide the same standard of care to research subjects in foreign countries—even if they would otherwise have no access to such treatment. In the best known example, researchers came under attack for conducting studies that proved the effectiveness of a simple and cheap AZT therapy for HIV-infected pregnant women (*Science*, 27 February 1998, p. 1299). Some women received a placebo, even though AZT is effective and is standard treatment in the United States. The researchers considered this reasonable because the standard course of AZT is too expensive for most poor countries.

The NBAC panel acknowledges such dilemmas. The report says that researchers and sponsors should provide "established, effective treatment" to all study participants, whether or not it would usually be available. However, the guidelines allow exceptions. For example, if a researcher can explain to an ethical review board why providing treatment would render a study irrelevant to the host country, then a trial without standard therapy might be acceptable. Offering such flexibility is a step in the right direction, says physician and bioethicist Robert Levine of Yale University School of Medicine. The requirement that all studies provide the best known treatment is "out of touch with the realities."

The NBAC report would permit some flexibility on informed consent as well. Researchers have complained that a traditional U.S. requirement—that each volunteer must sign a written document that outlines possible risks and benefits—is meaningless in countries where few people read or write. Although individual informed consent is required, the report says, a written document may not be. In places where a request to sign a document may seem threatening, for example, ethics review boards could allow researchers to document verbal consent of some kind.

The panel's most controversial recommendation involves obligations both before and after a study takes place. Before work begins, the recommendations state, researchers and sponsors should explain how treatments that prove successful will be made available both to research participants and to the country as a whole. Although the principle is laudable, the guideline expects too much of researchers, says Francis Crawley of the European Forum for Good Clinical Practice in Brussels, Belgium. "These are enormously complex discussions," he says. "Often there is no way [a researcher] can tell how a treatment might be made available." Bioethicist Norman Fost of the University of Wisconsin, Madison, thinks such a requirement could slow down or prevent important trials. In the developing world, he says, participation in a trial is often a benefit, not a burden. In addition, he says, "there's no moral basis for the claim that individuals who aren't in the study are owed something."

NBAC will accept public comments on the draft through 13 November, says executive director Eric Meslin, and it aims to approve final guidelines in December.

–GRETCHEN VOGEL

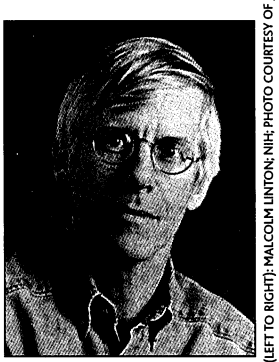
ETHICS

Epidemiologists Wary of Opening Up Their Data

ATLANTA—Epidemiologists, like journalists, have a tradition of protecting their sources, but now they're confronting demands that they open their files to the public. At the annual meeting of the American College of Epidemiology (ACE) here on 26 September, members debated how to comply with new federal rules that mandate data sharing. Finding a way to do that without jeopardizing subjects' privacy will be hard, many said. Indeed, some researchers warned that privacy concerns are already making it difficult, if not impossible, to recruit participants for some studies. Despite the sometimes heated discussions, Jonathan Samet, chair of epidemiology at Johns Hopkins University in Baltimore, Maryland, reminded the crowd that in reality, "there isn't a debate. There's a law."

Samet, ACE's president, was referring to a rule known as the "Shelby amendment," which passed Congress in 1998. As interpreted by the Office of Management and Budget, it requires federally funded researchers to make available raw data that support results that have been used "by the federal government in developing policy or rules" (*Science*, 12 February 1999, p. 914). Some researchers say that the best way to deal with potential requests for data is to routinely deposit material in an archive that can be opened to the public when results are published. But this idea was not popular in Atlanta, where, by a show of hands, the audience voted overwhelmingly against it.

Indeed, defenders of the public archive idea were hard to come by, says debate orga-



Data release. Christine Bachrach *(left)* argued for public archiving; Jonathan Samet warned of hard lessons ahead.

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* Available at http://bioethics.gov