distribution is subtracted from the other, an interference pattern would result. When the team subtracted the distributions, they obtained ripples which matched predictions of models of how covalent bonding electrons might intrude into the hydrogen bonds. "We see that this is really the model that explains the data. ... The classical electrostatic picture is not enough," says team member Abhay Shukla of ESRF.

Electrons spread out in this way because of a purely quantum-mechanical effect known as delocalization, says Shukla. Electrons seek the lowest possible energy state, and for the covalent bonding pairs in water, the lowest energy state apparently extends into the hydrogen bonds. Scientists studying water and other materials with hydrogen bonds will now have to take into account the complex nature of their bonds, and a commonplace material is looking increasingly strange.

–ALEXANDER HELLEMANS

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NCI Asked to Increase Focus on Minorities

Cancer researchers are likely to be asked to pay more attention to minorities and the "medically underserved" in the wake of an analysis released last week by the Institute of Medicine (IOM). The report, ordered by Congress more than 2 years ago, contends that the National Cancer Institute (NCI) is not spending as much as it claims on studies of minorities and urges it to do more. The IOM panel also proposes a significant change in the way NCI gathers incidence and mortality data: It rejects standard racial categories and recommends that data be collected in ethnic or cultural categories. NCI leaders agreed in principle but said they face many practical barriers in trying to change the way data are collected.

Bottom line. Senator Specter asked how much NCI spends on research involving minorities and the "medically underserved."

The IOM panel offered its advice more in support than in anger, noting that NCI already is headed in the right direction. "During the time that the committee was developing recommendations, we could see that they [NCI officials] were also thinking along the same lines," says M. Alfred Haynes, former president and dean of Drew Postgraduate Medical School in Los Angeles, who chaired the 16-member IOM panel.

The 272-page report, titled "The Unequal Burden of Cancer," will almost surely increase pressure on the National Institutes of Health (NIH) and NCI during this year's round of appropriations hearings to direct more research toward minorities and the medically underserved. Among the disparities the report notes: Cancer incidence is 15% higher among African-American men than among white, non-Hispanic men; all minority groups have higher rates of stomach cancer than white Americans have; and the 5-year survival rate of Native Americans from all types of cancer is only about two-thirds that of whites.

The report suggests that poverty and lifestyle are at the root of these differences, and it frequently praises NCI's "excellent" leadership and its "impressive array" of minority-oriented research efforts. But the IOM panel and NCI are not in agreement about everything. NCI says it spent $124.4 million in fiscal year 1997 on research relevant to minorities and the medically underserved. The panel, rejecting NCI's definition of relevant research, says the figure is only $24.2 million. Senator Arlen Specter (R–PA) homed in on these numbers in his very first question at a hearing of his Senate Appropriations Subcommittee on Labor, Health and Human Services, and Education on 21 January, the day after the report's release. "This is a very fundamental question as to resource allocation," Specter said. "I want to get to the bottom of it."

The dispute, however, may be largely a matter of accounting. NCI includes in its $124.4 million the cost of enrolling minorities in clinical trials and outcomes studies. The IOM panel contends that NCI should count only research projects that address "a priori research questions uniquely affecting minority and medically underserved groups."

NCI director Richard Klausner argues that "to segregate research this way would isolate the data we obtain, limit our ability to compare with the full population, and restrict our discovery of trends within subgroups that may only be discerned across

CREDITS: (TOP) U.S. NAVY; (BOTTOM) RICK KOZAK

ScienceScope

Dive! Dive! Scientists at the Armed Forces Institute of Pathology (AFIP) in Washington, D.C., regularly take on macabre and unusual assignments, including the grisly task of analyzing the remains of bomb blast victims. Now, thanks to controversial U.S. Navy plans to battle test one of its new Seawolf submarines (right) off the coast of Florida by detonating five nearby underwater mines, AFIP researchers may be examining corpses of another kind: whales, dolphins, and sea turtles.

Some conservationists fear that the Navy blasts—scheduled for sometime after 2000—could kill or injure the legally protected sea creatures. So, as part of a test permit, the National Marine Fisheries Service (NMFS) has required the Navy to fund, for a year after the blasts, AFIP studies of animals that strand on nearby beaches. The AFIP researchers—who have in the past conducted other studies on marine mammals—will be looking for evidence of explosion-induced "barotrauma," such as shattered ear bones. The free exams are a "wonderful" windfall to marine researchers, says Blair Mase, who coordinates regional stranding studies for NMFS in Miami.

Court Date A dozen scientists at the Georgetown University Medical Center in Washington, D.C., have followed through on their threat to sue the institution, claiming the university's directors ran roughshod over opposition to a new salary policy (*Science*, 22 January, p. 487). The complaint, filed 15 January, charges that the new policy—which ties salaries more tightly to a researcher's ability to win grants—"abrogated the core principles of tenure at the University and overturned 200 years of tradition in the treatment of Georgetown faculty." Several campus grievance committees have found in favor of the protesters over the last year. But university officials say they played by the book in overriding the rulings and implementing the new policy last July. A D.C. Superior Court judge could hear opening gambits as early as April.

Contributors: Eliot Marshall, David Malakoff, Dennis Normile

the general population." And Otis Brawley, head of NCI's Office of Special Populations Research, notes that the sort of outcomes studies that the panel would exclude have demonstrated repeatedly that "equal [medical] treatment yields equal outcomes." He also says NCI submitted a list of 127 tightly focused studies totaling $43.9 million, not $24.2 million.

Less eye-catching but potentially more significant is the panel's recommendation that NCI go beyond traditional racial classifications and gather surveillance data on the basis of ethnic groups and socioeconomic status. The federal Office of Management and Budget (OMB) directs that government statistics be gathered in terms of four racial classifications—American Indian or Alaska Native, Asian or Pacific Islander, black or African American, and white—and one ethnic classification, Hispanic or non-Hispanic. But the concept of race "rests on unfounded assumptions," the IOM report says, noting that there is more genetic variety within racial groups than between them.

NCI would do better, the report says, to define population subgroups in terms of ethnicity, embracing country of ancestry and a range of "cultural and behavioral attitudes, beliefs, lifestyle patterns, diet, environmental living conditions, and other factors that may affect cancer risk." The report does not specify the categories but calls on NCI and NIH to develop uniform definitions of ethnicity and of "special populations" to study diseases in the medically underserved. This approach, the IOM panel says, might better highlight disparities between groups and point to new directions for research into risk factors.

Klausner agreed that the OMB racial classifications "are not scientifically sound," and he told Specter's subcommittee that NCI "has gone well beyond" them in such efforts as its Surveillance, Epidemiology and End Results (SEER) program. He also endorsed the need for better data and a uniform definition of the medically underserved; NCI already is funding research in that direction, he said. But Klausner said that because of the importance of linking with other data sources—such as the Census Bureau, Medicare records, and state health department records—NCI can't break away from the current OMB categories on its own.

Klausner disagreed, however, with the panel's recommendation that the NCI Office of Special Populations Research be given line authority, including its own budget for awarding grants, and he challenged the panel's assertion that NCI has no strategic plan for addressing cancer burdens among minorities and the underserved.

NCI officials have not yet completed a cost estimate for implementing the panel's recommendations, although Brawley says it would be "large—in the tens of millions." For at least one member of the IOM panel, however, that price may be acceptable. "If you want to have increased surveillance, if you want to recommend that SEER do more, you've got to give it more money," says Gilbert Friedell of the University of Kentucky Markey Cancer Center in Lexington. "This is not an effort to constrain NCI. We're supporting NCI."

—BRUCE AGNEW

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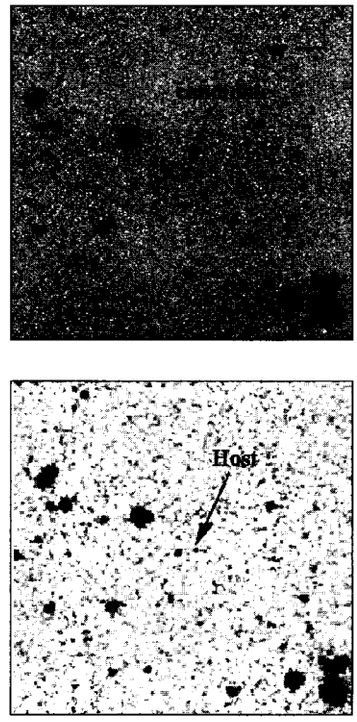
ASTROPHYSICS

Gamma Burst Promises Celestial Reprise

Missed the latest gamma ray burst? Never mind: There's about to be a replay, or so astronomers hope. Last Saturday, one of the brightest of these mysterious blasts of gamma and x-rays triggered satellite detectors. Two days later, after hunting down and analyzing the visible light from the burst source, astronomers concluded that the burst probably looked so bright because the gravity of a galaxy between Earth and the source focused its radiation toward us.

"It is the first such case found," says George Djorgovski of the California Institute of Technology in Pasadena. If a gravitational lens did brighten the burst, a reprise could come shortly, with the arrival of radiation refracted toward Earth along a different, slightly longer route. That would give astronomers a second chance to study the event.

The Italian-Dutch satellite BeppoSAX and NASA's Compton Gamma Ray Observatory (GRO) picked up the initial gamma burst on 23 January at 09.47 Universal Time. BeppoSAX's wide-field x-ray cameras—which have finer resolution than gamma detectors—also detected x-rays from the burst, pinpointing its position so that astronomers on the ground could search the spot for signals in visible light or radio waves.



Distant fire. The afterglow of a gamma ray burst (*top*) may have been intensified by the gravity of a faint nearby galaxy ("host,"*bottom*).

CREDIT: ODEWAHN, BLOOM, KULKARNI

A mere 18 seconds later, after being triggered automatically by a signal from GRO, the Robotic Optical Transient Search Experiment, a robotic camera array in New Mexico operated by the University of Michigan, the Los Alamos National Laboratory, and the Lawrence Livermore National Laboratory, recorded a relatively bright new "star" at the burst position. Half a minute later, this "optical transient" had brightened 15-fold, enough to be easily visible to amateur telescopes.

The burst's brightness and the visible glow suggested that the source of the burst must be nearby. The discovery of a faint galaxy at the burst position seemed to support that idea. But events did not bear it out. The galaxy has a redshift—a measure of distance—of between 0.2 and 0.3, modest in the cosmic scheme. Analysis of the optical transient, done on Sunday with the 10-meter Keck II telescope on Mauna Kea and the Nordic Optical Telescope on La Palma in the Canary Islands, placed the burst at a redshift of 1.6, however.

At that distance, roughly 80% of the way across the visible universe, Djorgovski calculates that the explosion would have had to have a staggering 2.3×10^{54} ergs of energy to explain its brightness at Earth, assuming nothing unusual had intensified its light. At maximum brightness, the visible "star" would have had to be as luminous as 100,000 galaxies.

Those numbers are implausible, Djorgovski thinks. The juxtaposition of the distant burst and the nearby galaxy suggests to him that the galaxy or the cluster it belongs to has acted as a gravitational lens, increasing the apparent brightness of the distant burst by a factor of 10 to 50 or so. Depending on how the gravitational lens has warped the paths of the radiation, additional burst images could flash into view within days, weeks, or months, says Jens Hjorth of the University of Copenhagen in Denmark. He hopes that this time around his colleagues will be ready to watch the burst from the moment it occurs.

—GOVERT SCHILLING

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