when the field is changed by just 1%. Yacoby's group also sees an odd mosaic of compressibility variations.

The images Ashoori showed in Florida only deepened the puzzle. "We see objects that look like perfect rings," he says. "Now why would electrons form circles like that?"

Some physicists caution that the technique itself—in particular, the presence of the tip and the charge pumping—might be creating these patterns. Still, most physicists are enthusiastic about the technique's potential. Allan MacDonald of Indiana University in Bloomington thinks it might also be useful for revealing other exotic electron configurations that can form in a 2DEG, such as a Wigner crystal, where the electrons don't slosh around like a liquid but remain in fixed positions to form a lattice. Even when they are buried in a semiconductor, electrons can't hope for much privacy anymore. **–MEHER ANTIA**

Meher Antia is a science writer in Vancouver.

CREDIT: FERMILAB

Catching mystery rays. A prototype detector at the Fly's Eye in Utah, which is searching for the highest energy cosmic rays.

ASTROPHYSICS

Powerful Cosmic Rays Tied to Far-Off Galaxies

A pair of astronomers may have solved a long-standing puzzle about the source of ultrahigh-energy cosmic rays, particles that slam into the atmosphere with 100 million times the energies reached in the largest particle accelerators. They have traced a handful of these particles back to highly energetic active galactic nuclei, the turbulent centers of distant galaxies that may harbor massive black holes. The finding, reported in the 26 October issue of *Physical Review Letters*, could upset current notions about the nature of ultrahigh-energy cosmic rays.

Astrophysicists have figured that the highest energy cosmic rays have to originate near our galaxy. That's because any charged particle, like a proton, that has traveled farther would have been slowed to lower energy levels by the microwave background—the low-energy radiation that pervades the universe. But no one has been able to find a nearby source for the ultrahigh-energy rays.

Glennys Farrar, now at New York University, and Peter Biermann of the Max Planck Institute for Radioastronomy in Bonn suspected a more distant source: a highly energetic class of active galactic nuclei that have intense magnetic fields, which might be capable of accelerating particles to high energies. Because each incoming cosmic ray sets off a chain reaction in the atmosphere that ends in a detectable shower of electrons or positrons, Farrar and Biermann could figure out the approach angle of five cosmic rays. In each case, the path of the incoming ray could be traced back to a previously identified active galactic nucleus. The probability of the cosmic rays lining up with such galaxies by pure chance is only 0.5%, the researchers say.

"If the correlation is as good as they claim, then it's very, very suggestive that we may well have found the source of these extremely high-energy cosmic rays," says Raymond Protheroe, an astrophysicist at the University of Adelaide in Australia. But he adds that this would upset the current assumption that cosmic rays are made up of protons or atomic nuclei, because they could never retain such high energies over such long distances. If Farrar and Biermann are right, "whatever's getting to us cannot possibly be a proton," says Protheroe.

Farrar and Biermann hypothesize that the ultrahigh-energy cosmic ray particles could be new neutral particles or neutrinos, which would not interact with the microwave background. But given that the analysis rests on just a handful of events, they say, much more work will be needed to close the case.

–DENNIS NORMILE

RESEARCH MANAGEMENT

New Law Could Open Up Lab Books

Tucked into last month's giant spending bill is an unwelcome message to academic researchers: Their data may be fair game for anyone who asks.

A few words in the section funding the White House Office of Management and Budget (OMB) would extend the federal Freedom of Information Act (FOIA)—a 1966 law to make government more accountable to the public—to extramural grants. That opens the possibility that scientists at universities, hospitals, or nonprofit organizations might have to turn over the contents of their computer disks of data, or even their lab notebooks, in response to a request to the agency that funded their work. "We're all very troubled," says Wendy Baldwin, deputy director for extramural research at the National Institutes of Health.

The language, inserted by Senator Richard Shelby (R–AL), says OMB must revise its rules for administering federally funded research grants "to require Federal awarding agencies to ensure that all data produced under an award will be made available to the public through the procedures established under the Freedom of Information Act." Private parties requesting the data may be charged "a reasonable user fee." At present, only funding agencies themselves can ask grantees for data. The new language implies that federally funded researchers must turn over their data to anyone who files a FOIA request. "The taxpayers have a right to much of this information," says Shelby.

The roots of the provision go back to last year's controversy over new Environmental Protection Agency air pollution rules for fine soot. Industry groups and some legislators demanded that university researchers hand over their data on the health effects of the pollution, leading to an unsuccessful legislative proposal requiring public data release (*Science*, 8 August 1997, p. 758). This year, a separate funding bill containing a request for OMB to study the issue was vetoed by President Clinton for unrelated reasons, leading Shelby to insert more direct language in the massive spending bill passed before Congress adjourned (*Science*, 23 October, p. 598).

Some observers are outraged that this sweeping measure was passed with no hearings. "It is ironic that a provision described as a sunshine provision needed to be tucked into a 4000-page bill in the dead of night," says Representative George Brown (D–CA), ranking Democrat on the House Science Committee. And some health researchers are worried that the directive will give industry a new tool to stall health regulations. "If past history is any indication, vested interests will misuse [this provision] to discredit valid research results they don't like and to harass the researchers doing the work," says New York University environmental scientist George Thurston, whose studies helped form the basis for EPA's contested regulations.

Others worry that raw data will be requested before it has been analyzed and peer reviewed. "It's important that we have processes in place for data sharing, but this basically opens the door to anyone's data without any filters," Baldwin says. University researchers say that privacy and proprietary data might also be compromised.

The question facing OMB now is how to implement the new requirement. Agency officials say they hope to be consulted in a process likely to take many months.

–JOCELYN KAISER