the distinction between embryos created with somatic cells and those created from an egg and sperm is nontenable."

ES cell workers welcome the report, says Martin Pera of the Monash Institute of Reproduction and Development in Melbourne. Currently, scientists face a jumble of legislation that varies among state and territorial jurisdictions. For instance, Pera and his Monash colleagues derive ES cells in Singapore because it is illegal to do so in the state of Victoria. "This report finally provides a clear framework for Australian scientists," he notes.

In Israel, a national bioethics committee has approved both the derivation of ES cells and research into therapeutic cloning. The report, issued by the Bioethics Advisory Committee of the Israel Academy of Sciences and Humanities on 4 September, does not have the force of law, says committee member and molecular biologist Hermona Soreq of the Hebrew University of Jerusalem, but she expects the national science funding agency to follow its recommendations.

This report lends important formal support for Israel's existing policy, says Nissim Benvenisty, an ES cell researcher at Hebrew University. Joseph Itskovitz of the Rambam Medical Center in Haifa, for instance, has already derived several ES cell lines in Israel.

In 1999, the Israeli Knesset passed a 5-year moratorium on cloning procedures that lead to "the creation of a whole human being." However, the ethics committee wrote that the law "does not rule out producing cloned embryos that will not be implanted," giving the green light to therapeutic cloning. The full report will be published on the academy's Web site at www.academy.ac.il.

**–LEIGH DAYTON AND GRETCHEN VOGEL**

Leigh Dayton writes from Sydney, Australia.

CONDENSED MATTER

## Quantum Condensate Gets a Fresh Squeeze

Cooled to a few billionths of a degree above absolute zero, atoms in a Bose-Einstein condensate (BEC) represent an extreme state of matter. But physicists at the Massachusetts Institute of Technology (MIT) have subjected the atoms in condensates to even more outrageous ordeals, squeezing them into one-dimensional lines and two-dimensional planes. The experiments, reported in the 24 September issue of *Physical Review Letters*, open the door to investigating a new regime of physics in which the rules are easier to understand.

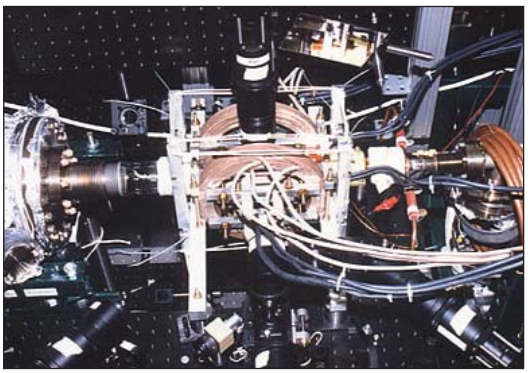
In a BEC, atoms lose their individuality. Cool a clump of matter enough, damping out the random thermal motions of the particles, and the atoms can merge, becoming, in a quantum-mechanical sense, a single coherent object. For the past 5 years, scientists around the world have been experimenting with the strange properties of these atomic ensembles, listening to them ring with sound waves, building atom "lasers" with them (*Science*, 13 February 1998, pp. 986 and 1005), and using them to slow light to a crawl.

But these experiments all probed three-dimensional BECs. One- and two-dimensional systems have "strikingly different physics," says MIT physicist and team member Wolfgang Ketterle. "Critters or creatures in a one-dimensional world can't pass by each other, for example," changing the behavior of the system as a whole, he says.

William Phillips, a Nobel laureate at the National Institute of Standards and Technology in Gaithersburg, Maryland, says lower dimensional BECs are exciting for their potential use in studying phenomena such as solitons—stable waves—within BECs. "In 3D, [solitons] can break up into vortices and phonons. There are instabilities because of these possibilities," he says. "In one dimension, there are fewer things that can happen," making the solitons more stable.

To make lower dimensional BECs, the MIT group started with ordinary 3D BECs made of sodium atoms. For the 1D BEC, the group simply trapped the condensate in strong magnetic fields and stretched it into a cigar shape. The extreme fields made it much easier for atoms in the condensate to flow along the cigar's long axis. As a result, atoms could move in only one dimension if shoved by an outside force. "If you bang it, it's going to respond axially; it's not going to respond radially," says physicist Randall Hulet of Rice University in Houston. (Similar results with lithium atoms were published last month by a French group.)

The 2D BEC took an extra step. Instead of staying in a magnetic trap the entire time, the atoms had to be transferred to an optical trap, where the condensate was confined by a sheet of light. The MIT team then watched as the condensates switched over from three dimensions to two or one dimension.



**Torture chamber.** The BEC II device at MIT crushes an extreme form of matter into lower dimensions.

CREDIT: W. KETTERLE/MIT

Hulet and Phillips agree that Ketterle's results are only a beginning. Researchers would learn more by watching condensates form in lower dimensions, they say, instead of squeezing a 3D cloud into the required shape. Nonetheless, "it's a first step to being able to do interesting physics in a new regime," Hulet says. Torturing a few sodium atoms is a small price to pay for such an opportunity.

**–CHARLES SEIFE**

PALEOANTHROPOLOGY

## Tools Show Humans Reached Asia Early

If Africa was the cradle of humanity, then Asia was the crossroads of early human migrations. Asia was the first continent that early humans explored on their exodus from Africa and was the jumping-off point for later treks to the New World, Australia, and perhaps Europe. But exactly when early humans first reached Asia has long mystified paleoanthropologists. The first signs of their presence are *Homo erectus* fossils dated to between 1.7 million and 1.9 million years ago in Dmanisi, Georgia, on Asia's western edge, and in Java, Southeast Asia (*Science*, 12 May 2000, p. 948). But there are still questions about some of those dates, and other traces of ancient Asians are questionable until about 1 million years ago.

Now, in this week's issue of *Nature*, the case for an early movement out of Africa is further boosted by new work dating Chinese stone tools to 1.36 million years ago. What's more, the tools were found in relatively cold northern China, by an ancient lake bed 150 kilometers west of Beijing. To reach that spot, early humans must have migrated long distances over difficult terrain, armed only with simple tool kits.

The new report is notable for its "very nice, clean" dating methods on pieces of stone that are indisputable tools rather than natural flakes, says geologist Frank Brown of the University of Utah in Salt Lake City. It also documents "the earliest known penetration of the northern latitudes by early *Homo* in Asia," says paleoanthropologist Russell Ciochon of the University of Iowa in Iowa City. "This demonstrates that *H. erectus* was able to adapt to more seasonal and challenging environments than previously considered."

The stone tools—simple flakes, cores, and scrapers—were found 21 years ago by Chinese geologists in the hilly badlands of the Nihewan Basin, at the northeastern margin of the dust-blown Loess Plateau. Researchers had suspected that artifacts at a half-dozen sites in the basin were more than