

New way found to cool atoms and molecules

Physicists at The University of Texas say they've found a new technique for cooling atoms and molecules, allowing more effective quantum physics studies.

The researchers report finding a way to use lasers to form walls that allow atoms and molecules to pass through in one direction, but do not allow them to return.

The technique might lead to advances in atomic clocks, which are used to standardize time.

Dr. Mark Raizen of the university's Center for Nonlinear Dynamics and his colleagues described the one-way wall technique in *Physical Review Letters* and *Europhysics Letters* published earlier this year.

Raizen's one-way wall extends the capabilities of laser and evaporative cooling, which have been limited to cooling a small number of atoms in the periodic table.

"The beauty of the one-way atomic wall," Raizen said, "is that there is almost no increase in kinetic energy."

With no increase in kinetic energy comes no increase in heat. By expanding and contracting the space holding the trapped atoms and molecules, the temperature can be lowered to near absolute zero.

It's at such ultra cold temperatures -- minus 459 degrees Fahrenheit -- that quantum physicists can manipulate atoms and molecules.

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