

Lasers inspire way to accelerate electron beams

[Click to Print](#)

02 September 2006

From New Scientist Print Edition. [Subscribe](#) and get 4 free issues.

An electron beam has been accelerated for the first time using a process that mimics the way lasers amplify light. The technique could lead to a new type of particle accelerator.

In a laser, a lamp excites atoms or molecules in a chamber to a higher energy state. When light with just the right frequency enters the chamber it prompts many of these particles to drop to a lower energy level, releasing their energy as an intense beam of light.

Now a research group from the Technion – Israel Institute of Technology in Haifa, including, Levi Schächter, Samer Banna and Valery Berezovksy, has used a similar idea to build a "paser" (particle acceleration by stimulated emission of radiation) and test it at the Brookhaven National Laboratory in New York. "In the paser, we inject an electron beam into a chamber of excited carbon dioxide molecules, instead of light," explains Banna.

The injected electron beam is separated into bunches and sent into the chamber at the precise frequency required to make the excited carbon dioxide molecules release their energy. The passing electrons absorbed it and speeded up, boosting their energy by 0.15 per cent. The work will appear in *Physical Review Letters*.

"This is the first time that energy stored within molecules has been used to accelerate particles," says Schächter who predicted the concept theoretically back in 1995. The team is now working on achieving larger accelerations and they hope that this technology will be used to develop a new generation of compact accelerators that may become a commonplace tool utilized in widespread applications.

From issue 2571 of New Scientist magazine, 02 September 2006, page 21

[Close this window](#)

Printed on Tue Nov 07 08:53:18 GMT 2006



SUBSCRIBE NOW

GET 10% OFF
AND 4 EXTRA FREE ISSUES
55 FOR THE PRICE OF 51
Plus Free Unlimited
Online Access

GO

NewScientist
YOU ARE
MADE OF
SPACETIME
our ultimate
origin revealed

Frozen Eden
Did the maker in fact?

The advertisement features a light blue background with autumn leaves at the top and bottom. A red circular button with the word 'GO' is positioned to the left of a stack of New Scientist magazines. The top magazine cover is titled 'YOU ARE MADE OF SPACETIME' and 'our ultimate origin revealed'. Below it, another cover is titled 'Frozen Eden' and 'Did the maker in fact?'.