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News in Science - Fastest stopwatch in the world - 27/02/2004

## Fastest stopwatch in the world

Agence France-Presse

Friday, 27 February 2004

A new ultrafast stopwatch can now measure the speed of atomic processes down to the smallest fraction of a second yet.

Austro-Hungarian physicist Professor Ferenc Krausz of the [Max Planck Institute of Quantum Optics](#) near Munich, Germany and colleagues report their research in this week's issue of the journal [Nature](#).

Krausz describes the device as "the fastest stopwatch in the world", capable of measuring the movement of atomic particles in time units of under a 100th of an attosecond - the name given to a quintillionth, or a millionth of a millionth of a second.

"This time is to a second what a minute is to the age of the universe," Krausz said.

Whereas modern microscopes allow scientists to look at atoms at rest, this device allows them to record changes in atomic structure that happen so fast that they could not be documented before.

"Our aim is to trace the movement of electrons inside atoms in real time. We need very short bursts of time to take shots of attoseconds," he told Agence France-Presse.

"This is just like taking pictures with an ordinary camera of something happening in split seconds and then put them next to each other to see the movement. We are trying to reconstruct what happens in atoms."

He said the device, developed by a team of Austrian and German scientists, works by flashing the shortest X-ray pulses yet developed in the world onto electrons, propelling them out of their atomic binding.

Deeper knowledge of what happens at this level, can help scientists to control chemical reactions and to synthesise new materials, he said.

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Imagine a stopwatch that can measure a millionth of a millionth, of a second (*Image: Office of Statewide Health Planning and Development*)

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