

Researchers make molecules 'pose' for photograph

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For anyone who has ever had trouble getting children to stand still for family photographs, consider the frustration of scientists who have always wanted to photograph isolated gas phase molecules, but they just wouldn't hold still long enough.

The rapid tumbling motions of gas phase molecules, such as those in the air around us, means that at any instant in time, the molecules are pointing in many different directions, and this blurs any image that may be recorded.

Now, using a pair of carefully crafted femtosecond laser pulses, a team of researchers at The Open University and the National Research Council of Canada have forced molecules to line up in the same direction to "pose" for a photograph.

When combined with the ultra-fast shutter speeds such as those provided by ultrashort pulses of X-ray light produced at some of the world's largest facilities, such as the European X-Ray Laser Project XFEL near Hamburg, which is being built to meet just this goal, this technique will allow for sharp images of isolated molecules to be recorded.

This new research "Field-free three-dimensional alignment of polyatomic molecules" is to be published in *Physical Review Letters* on November 3 2006.

Co-author Dr Jonathan Underwood of The Open University's

Department of Physics and Astronomy says: “This new technique means another of the barriers to understanding the science of our world has been lowered. This technique will allow us to take photographs in the very near future from which we’ll be able to map the atomic details of molecules as they re-arrange and undergo chemical processes.”

Source: The Open University

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