

## Attosecond Science Program

Written by Administrator

Tuesday, 01 March 2011 22:00 - Last Updated Tuesday, 05 July 2011 11:45

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The Attosecond Science Program in CXS, which began collaborating with CXS in June 2009, offers new opportunities for coherent X-ray science that are unique within Australia. The new and rapidly expanding field of attosecond science is based on recent revolutionary developments in ultrafast optics that resulted in the award of the Nobel Prize in 2005. It is now possible to generate high-energy infrared light pulses consisting of only a few cycles of the electric field and to control the optical electric field waveform within the light pulses. Such optical pulses have been used to generate isolated soft X-ray bursts with durations below 100 attosecond (1 as =  $10^{-18}$  s). They can also provide information on atomic and molecular dynamics on the attosecond timescale and have been used to map the electronic structure of molecules. The Australian Attosecond Science Facility (AASF) is the unique tool in Australia for attosecond science investigations. The facility is directed by A/Prof Kielpinski, leader of the CXS Attosecond Science Program as of January 2010. The heart of the facility is a laser source providing 6 fs, 300  $\mu$ J, phase-stabilized laser pulses, commissioned in 2007 through an ARC LIEF grant.