Optical Gating of Electron Pulses for Femtosecond and Attosecond Electron Microscopy and Diffraction Imaging Applications

UA ID Technology #ua18-144

Title: Optical Gating of Electron Pulses for Femtosecond and Attosecond Electron Microscopy

Invention: This technology provides a novel twist on the conventional optical gating technique and results in electron pulses of less than 100 femtoseconds. This provides improved temporal resolution for imaging done by electron microscopy and diffraction imaging.

Background: Traditional electron microscopes are limited in their temporal resolution. The current state of the art has only achieved 200 femtosecond electron pulse widths. Using faster optical pulses to gate the electron pulses has been limited by the limitations on the optical pulse widths to drive the gating.

Applications:

• Electronics manufacturing
• Materials science
• Forensic science
• Molecular mechanisms of disease (efficacy of treatment, predisposition to disease, etc.)
• Observing individual viruses and macromolecular complexes

Advantages:

• Improves temporal resolution
• Explores the ultrafast dynamics of matter
• Addresses a very specific industry demand

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