

Euclid TechLabs offers an affordable solution that will retrofit and upgrade your existing instrument into an Ultrafast Electron Microscopy device!



Introduction

- The UltraFast Pulsar (UFP™) is an electromagnetic module that is installed in an existing electron microscope that enables the electron beam to be pulsed.
- The pulsed beam can be adjusted from single electron events at repetition rates up to 12 GHz to continuous operation (native instrument).
- Only the module and drive electronics are required.
- It is a simpler, more affordable approach than the traditional laser-based ultrafast technique.

Typical Characteristics*

- Energy Range: 100 keV to 300 keV
- Beam Frequency Range: DC to 12 GHz
- Beam Pulse Width: 5 ps to 1 μ s
- Beam Duty Factor: DC to less than 0.1%
- Column Height: 30 cm
- Interface: Windows/LabVIEW™ Real-time (NI PXIe™)

*Typical TEM UFP design; contact Euclid for SEM version characteristics

Advantages

- Faster repetition rate provides faster data acquisition
 - *High resolution images in minutes with 10 pA pulses*
- Wide Tunability: Single-electron events to full DC beam current
- Low-damage Imaging
- Independent control of repetition rate and pulse width
- Cathode Independent: Maintain existing microscope e-gun
- Lower Cost
 - *Module and electronics are a fraction of laser system cost*
 - *Module mechanically incorporated into beam path, permanently aligned*
 - *User spends time on experiments instead of optical alignment & laser care*

Read about our innovation:

https://science.osti.gov/~media/sbir/pdf/Success-Stories/Euclid_2018.pdf

Euclid TechLabs is a Research & Development group that develops and manufactures microwave and RF components for accelerator and electron microscope applications.

Challenges in microwave technology, including the demanding requirements for high power RF materials, are not only where we work, but where we thrive.

OUR PRODUCTS & SERVICES

- Turnkey Compact Linac Systems
- Ultrafast TEM
- Photoinjectors
- Diamond Cathodes
- X-Ray Sources
- CVD Diamond Structures
- Ferroelectric Structures
- Sputtering Systems
- Software Development
- Consulting
- ...and more

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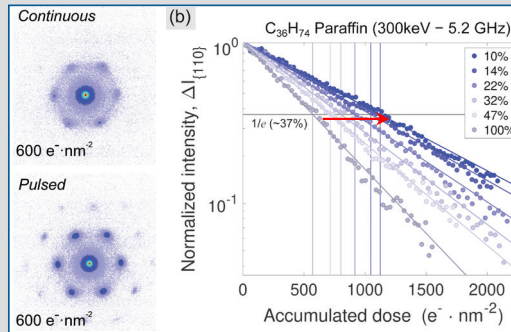
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Applications

- Low-damage/Low-dose Electron Microscopy
 - CryoEM
 - LDA studies, biological macromolecules
 - Properties of hyper-sensitive molecules
 - Proteins
 - Nano-engineered structures
- Electron Holography
- Electron Tomography
- Room Temperature Low-damage Microscopy
 - Extension of total electron dose on organic material
 - 2X increase in crystal fading value from DC beam (red arrow)



- Time-resolved Microscopy
 - Pump-probe stroboscopic microscopy (rf pump, beam probe)
 - Determine electric field characteristics in MEM device under rf excitation
 1. Spintronics of Magnetic and Plasmonic Devices
 2. NEMS/MEMS high frequency devices

TEM images showing high electric field areas (dark gray edges)

