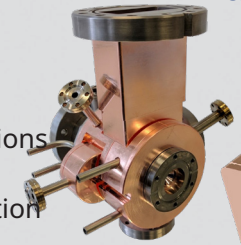
# Advanced Materials and Technologies for Beam Physics, RF and Electron Microscopy Applications

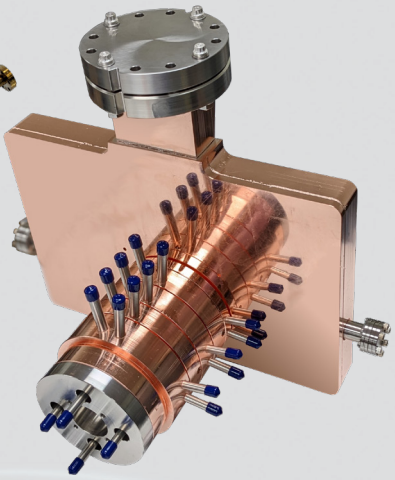
## *Innovations that deliver big power in small packages*

*Euclid is an R&D company specializing in high energy physics and energy sciences innovation. We provide our customers with cutting-edge technologies to the most difficult problems in accelerator physics, advanced material science, electromagnetics and system integration. Euclid's small team of engineers, physicists and software developers deliver unparalleled expertise over diverse technology areas.*

## *Accelerator Technology & Innovations*

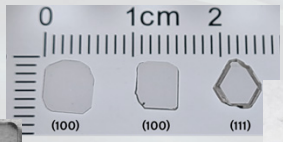
- Normal conducting, dielectric and SRF accelerator technologies
- Ultra-compact accelerator designs for medical and security applications
- High power RF components for any application
- Energy efficient fast ferroelectric tuner for microphonics compensation
- MeV UED/UEM beamline
- Ultra-compact (2 Tesla) objective lens
- Turn-key solutions

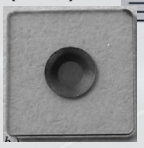


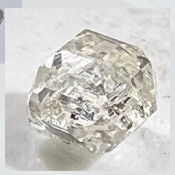


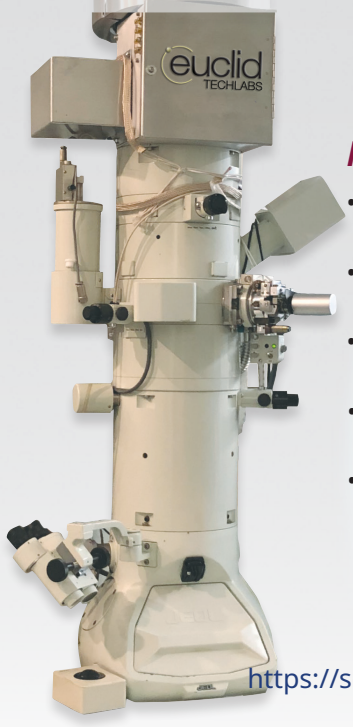
## *Diamond Technology*

- High Purity, high crystallinity, low defect density diamond material
- Suitable for X-ray optics, quantum and electronic applications
- High Pressure High Temperature (HPHT) and Chemical Vapor Deposition (CVD) growth reactors
- Diamond optics post processing & machining



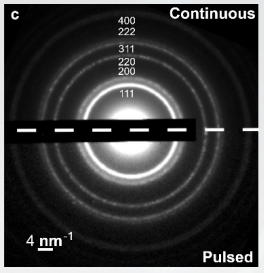








## *Pulser for Ultrafast Electron Microscopy*

- The UltraFast Pulser (UFP™) is an electromagnetic module that is installed in an existing electron microscope that enables the electron beam to be pulsed.
- Adjustable from single electron events at 12 GHz repetition rates up to continuous operation (native instrument).
- Simpler, more affordable solution than the traditional laser-based ultrafast technique.
- High repetition rate provides fast data acquisition with no fidelity loss
- Low-damage, stroboscopic and pump-probe imaging applications




## *Read about our innovations:*

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

euclid TECHLABS

*Euclid TechLabs:*

*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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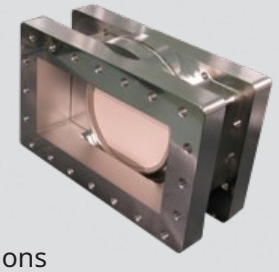
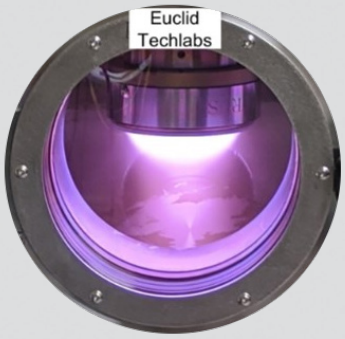
## *Advanced Materials*



- Low RF loss ferroelectric materials
- Conductive and non-conductive thin film coatings
- Epitaxial photocathode materials for high QE and emission
- 2D materials for productive thin films
- Low RF loss/DC conductive ceramics for microwave applications $10^{-8}$ S/m conductivity & $10^{5}$ loss tanget @ 650 MHz


## *Services*

- EM design including material and thermo analyses
- In house simulation tools: CST, HFSS, Comsol, Opera, Astra, Geant4, etc.
- RF and microwave simulation: generation, transmission and storage
- Charged particle beam simulation: emission processes, beam transport and energy recovery
- Radiation Shielded Testing labs
- Accelerator prototyping and small production
- 38 cu. meter Class 10k clean room for assembly
- Sub-nanometer vibration measurements and thermal mapping
- Femtosecond-laser fabrication lab for processing hard materials
- Deposition of conductive and non-conductive thin films
- Computer Vision Guided & Robotic Arm Control
- Custom diamond plates and optics

## *Clients*

- Argonne National Laboratory
- Fermilab
- Los Alamos National Laboratory
- MIT
- University of Oxford
- Brookhaven National Laboratory
- National Institute of Standards and Technology
- CERN
- and many others...

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