
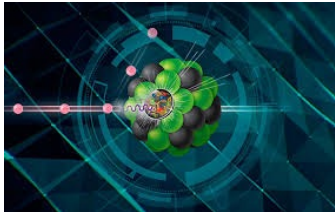
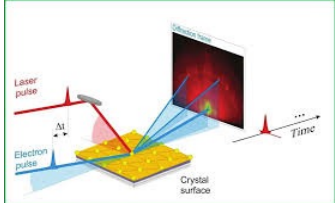


BEAM PRODUCTION Roadmap

The understanding, materials, and technology necessary to produce the brightest possible electron beams across the wide span of beam currents, pulse durations, and operating environments demanded by forefront scientific research and emerging technological applications.

TARGET DATES	FY 22	FY 23	FY 24	FY 25	FY 26	
OBJECTIVES	DELIVERABLES					APPLICATIONS
Develop photocathodes for high peak-intensity beam generation with <5 meV MTE	20 meV MTE photocathode at operational laser fluences					 <p>Free Electron Lasers like LCLS2 at SLAC will lase at significantly higher photon energies.</p>
	5 meV MTE photocathode at operational fluences by enhancing QE of ordered III-V and alkali antimonide photocathodes or other single crystals at threshold					
Design materials for long-lived cathodes in extreme electric field and high average	Robust protective coatings or new materials that extend photocathode lifetimes with little degradation in either QE or MTE					 <p>Enable extremely high currents for future particle colliders and x-ray sources.</p>
Approach fundamental brightness limits with nanostructure photoemitters	An electron source with normalized transverse emittance approaching fundamental limit of 0.2pm					 <p>Obtain unprecedented resolutions in ultrafast electron diffraction and microscopy to reveal new transient phenomena in materials.</p>
	Picometer emittances for higher charge per bunch					