

WG5: ERL Applications

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FEL, THz & Photon Applications

Field	Application	Group	Energy (MeV)	Current/Charge	Key Parameters	Size	Critical Performance Needs?	Challenges
THz	TD Spectrometry & Photochemistry	BINP			2.12THz			
	Optical Discharge	BINP			2.3THz, 66ps pulses			
	Material optical properties (ellipsometry)	BINP						
	Biological irradiation	BINP						
	Detonation dynamics	BINP						
	Pump-probe	BINP						
	Surface Plasmon Polaritons	BINP						
	Bessel Beams	BINP						
	CBETA	Cornell	135	500pC @ 10ps, 320mA, 4-pass	4THz	35m x 15m		
IR-FEL	Spintronics (magnetoactive materials)	BINP			$\lambda=9.3\mu\text{m}$			
	LERF – Dark matter search	JLab		60pC @ 3.3ps		60m x 5m		
	IR Microscopy – Cancer Diagnostics	Daresbury	30	80pC @ 0.1ps	$\lambda=9.3\mu\text{m}$	40m x 25m	λ /power stability	
Compton	CBETA	Cornell			412keV, 0.4% BW	35m x 15m		
	Compact LCS (medical imaging)	KEK	50	10mA	40keV,	10m x 6m		
	LCS γ -ray (nuclear detection)	KEK	350					
EUV	Compact ERL	JAI	30	1A		5m x 2m	TBD	
	Industry ERL	KEK	800	10mA, 60pC,	$\lambda=13.5\text{nm}$, >10kW	200m x 20m	FEL stability, Availability (>98%)	
Isotopes	$^{99}\text{Mo}/^{99\text{m}}\text{Tc}$	KEK	20-50	<10mA				
U-short Vortex Beam		JLab						

Review offline with contributors

Discuss today/tomorrow

Particle & Nuclear Physics Applications

Field	Application	Group	Energy (MeV)	Current/Charge	Key Parameters	Size	Critical Performance Needs?	Challenges
THz	TD Spectrometry & Photochemistry	BINP			2.12THz			
	Optical Discharge	BINP			2.3THz, 66ps pulses			
	Material optical properties (ellipsometry)	BINP						
	Biological irradiation	BINP						
	Detonation dynamics	BINP						
	Pump-probe	BINP						
	Surface Plasmon Polaritons	BINP						
	Bessel Beams	BINP						
	CBETA	Cornell	135	500pC @ 3200 pulses/class	4THz	35m x 15m		
IR-FEL	Spintronics (magnetoactive materials)	BINP			$\lambda=9.3\mu\text{m}$			
	IR Microscopy – Cancer Diagnostics	Daresbury		80pC @ 0.1ps	$\lambda=9.3\mu\text{m}$	40m x 25m	λ /power stability	
Compton	CBETA	Cornell			412keV, 0.4% BW	35m x 15m		
	Compact LCS (medical imaging)	KEK	50	10mA	40keV,	10m x 6m		
	LCS γ -ray (nuclear detection)	KEK	350					
EUV	Compact ERL	JAI	30	1A		5m x 2m	TBD	
	Industry ERL	KEK	800	10mA, 60pC,	$\lambda=13.5\text{nm}$, >10kW	200m x 20m	FEL stability, Availability (>98%)	
Isotopes	^{99}mTc	KEK	20-50	<10mA				
U-short Vortex Beam		JLab						

To be completed post Friday morning session

Review offline with contributors

Discuss today/tomorrow

ERL Needs & Challenges

For THz, Compton, IR, EUV and X-Ray applications:

- Key performance requirements:
 - Stability areas, availability
- Challenges generating ERL output.
- Delivery mitigation strategies.
- Future application field priorities:
 - THz
 - Compton
 - FEL
 - EUV
 - X-Ray
- Similar questions for PP and NP applications for Friday!

Speaker input needed!

- Please provide additional input to parameter table, ahead of the Friday summary session:
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Note:

- File located in today's session at 11:20 – 11:40.