

Dual Mode Parameter Table - Status 6/19/2015

Technique	Dual Pulse	Dual Energy	Same Energy	Pulse Separation	Min Bunch Length	Energy Range	Energy Separation	Max Pulse Energy	Mode	Comments
Laser Stacker (TWIN BUNCHES)										
SASE	yes	yes	no	0 - 100 fs	~ 10 fs	HXR, SXR	- 1%, -3%	~ 1.2 mJ total	SASE	for HXR 1st bunch always higher photon energy
twin bunches + V slotted foil	yes	yes	no	0 - 50 fs	-5-10 fs	SXR	-3%	50 uJ	SASE	Allows true 0 delay and reverse the arrival order of the pulses
twin bunches + HXR Self-Seeding	yes	yes	no	0-100 fs	~ 10 fs	HXR	-1 %	150 uJ per pulse	SEEDED	Both colors or a single color can be seeded
Split undulator										Two different source locations on the longitudinal coordinate, allows for two different pointings for the
Single bunch SASE	yes	yes	yes	~>0 - 900 fs or ~>0-50 fs	~ 10 fs	SXR,HXR	~ 2.5%	150 uJ, 75 uJ	SASE	Max pulse energy is for balanced intensity colors. For the unbalanced case, higher pulse energy can be reached. Delay can reach 900 fs only at SXR if first
One pulse seeded	yes	yes	yes	~>0 -50 fs	~ 20 fs	SXR	~2.5%	150 uJ total	SASE+SEEDED	Delay can be non zero only if Seeding is fully amplified before HXRSS chicane
Two Polarization, Two Color, Two Pointing	yes	yes	yes	~>0 - 900 fs or ~>0-50 fs	~20 fs	SXR	~2.5%	30 uJ per pulse	SASE	Under development. First color must be linearly polarized.
Double Slotted Foil (Proposed)	yes	no	yes	15 - 70 fs (SXR); 7-20 fs (HXR)	~ 10 fs	SXR, HXR	n/a	100-300 uJ	SASE	
Double Slotted Foil	yes	yes	yes	15 - 70 fs (SXR); 7-20 fs (HXR)	~ 10 fs	SXR, HXR	~1.5%	100-300 uJ	SASE	can get same energy for the dual pulses, and easier
Two laser/two bucket (ns Double bunch)	yes	yes	yes	350 ps increments, +/- 38 ns	~ 10 fs	SXR/HXR	~ 2%, possibly more	1-2 mJ	SASE or SEEDED	under development

For detailed information and trade-off decisions, contact the Instrument Scientist!