Femtosecond timing analysis

LW61 (example)

Sequencer event codes in the DAQ:183: "Laser On" 179: "Laser Off" 137: "Every HXR Beam"

13: "Every SXR Beam 162: "BYKIK"137 will trigger Jungfrau readout. 13 and potentially 162 will be used for TimeTool calibration. The plugin, which records the delay between the optical laser and the x-rays, locates an edge on the time tool spectra. We calibrate this with a "laser on" but "X-rays off" i.e. 183 and 13 are TRUE

				DAQ	Control				
Pulses E	ventCo	des Sequencer							
Sequence	er Cod	es							
Enable	e Code	Туре		Describ	5	Reporting	1		
	187	Command	-	nce Tri	gger				
	13	Command	-	SXR be	am				
	183	Command	-	Laser C	n				
	179	Command	-	Laser C	off				
	0								
	0								
	0								
	0								
	0								
	0								
	0								
	0								
	0								
Glabal C	odor								
Enable	le Code			Туре		Describe	Reporting		
	137 [8	137 [Every HXR Beam] -		Readout					
	162 [I	162 [BYKIK] -		Command					
	40 [1]	20 Hz]	•						
	40 [12	20 Hz]							
Readout	Group	Support Off -							
		Save				Cancel			

WIP: generate sequence with `~cxiopr/experiments/cxilw6120/sequencer.py` which pushes the sequence in the sequencer:

		Event :	Sequence	Configura	tion –	n x		
E	vent Code	Sequenc	e 5	Sequence Ow	ner 5 0			
				Photon Beam	Owner 5			
	Once	Stat	tus	s	nchronization Settin	gs		
	Repeat N Time:	Beam	Rate 12	0.0 Syn	ic Marker 10Hz			
	nepear roleve	Play C	Count	Ne>	t Sync Immed	iate		
	start Ste	D Dian C	ray Cnt	Run	Timesic			
		Curren	it Step	-11-	C Spare Sequence	15		
	afina Samu							
0.	enne sequ	ence 🗾			Event Code Alloc	ation		
	Valid Seque	nce at st	ep 0		Load spreadsheet			
St	op at Step: 20				Save spreadshee			
Ste	p Event Code	∆Beam	AFiducial	Burst Count	Device/Function	in		
0	179	1	0	0	Laser On			
1	183	1	0	0	Darkt			
2	179	1	0	0	Dark2			
3	183	1	0	0	Dark 3	_		
4	179	1	0	0		_		
5	179	1	0	0		-		
6	179	1	0	0		-1		
7	183	1	0	0		-		
8	179	1	0	0	-	-1		
9	183	1	0	0		_		
10	183	1	0	0		-1		
	192					_		
12	100		10	0		-1		
19	103					-1		
14	183	1		0	-	-1		
16	100				1	- 1		
13	103		10					
IG	183	1	0	0		-8		
	183	1	U	U				
18	179	1	0	0		- 1		
18	179	11	0	0				
			Puthon: o	pr/cviopr				
In Edit View Com	h Tarmi I	Hele	r ython: o	processor				- 0
le Edit View Searc	n Terminal	Help	orcon+-	50 rande	m="True")			
179, 1, 0, 01. [183, 1. (), 0],	[179, 1.	0, 0].	[183, 1, 0	. 01.	[179.	1, 0, 01
179, 1, 0, 0], [179, 1, 0	0, 0],	[183, 1,	0, 0],	[179, 1, 0	, 0],	[183,	1, 0, 0]
183, 1, 0, 0], [183, 1, 0), 0],	[183, 1,	0, 0],	[183, 1, 0	, 0],	[183,	1, 0, 0]
183, 1, 0, 0], [183, 1, 0), Θ], Ι	[183, 1,	0, 0],	[179, 1, 0	, 0],	[179,	1, 0, 0]
[5]:								

BYKIK

in cxi3: lcls.bykik_set_period(17)

Useful Links

- LCLS Confluence documentation:
 - TimeTool
 - Re-running the DAQ's Timetool Analysis Offline in psana
 TJ's draft Timetool Processing Improvements for psana
 - 1.3 smallData contents
- Other:

 - https://www.minabionta.com/research-lcls
 Nelson, S. Developing a toolkit for analysis of LCLS pump-probe data (2019)
 Glownia et al. Pump-probe experimental methodology at the Linac Coherent Light Source (2019)