BL-15A2 BPM の起動及び調整方法 スタッフ向け (通常は項目3だけで OK。1,2 は立ち上げの時だけ)

## 1.機器の確認

<信号切替 Box とピエゾの電源>

・ビームライン上流の制御 PC ラックの左側、以下の写真のように 19 インチラックの枠内にある。



・信号切替 Box(上の段右側)の左の LED(A2)が点灯していることを確認する。右の LED(A1)が 点灯していたら、トグルスイッチで切り替えること。



・ピエゾの電源(下の段)が入っていることを確認する。電源が入っていなければ左下のスイッチ を入れる。ボリュームを回して、枠内の LED を中心に持ってくる(OFFSET2.5)。



<シーケンサ(PLC)と電流アンプ>

・BL-15A2 ハッチ内上流部のスリット架台に取り付けられている PLC の電源が入っていることを、 LED が点灯していることで確認する。



・スリット架台に設置されている FEMTO アンプ2式の電源が入っていることを、スリット架台の間の 床下においてある電源アダプタ(枠内)の LED が点灯していることで確認する。



<バイアス電源と駆動用ドライバ>

・BL-15A2 ハッチ内上流部の中量棚の下の2段に設置してあるバイアス電源、駆動用ドライバの 電源が入っていることを確認。バイアス電源は、OUTPUT の LED が点灯していることを確認!



#### <u>2.BPM 位置の粗調整</u>

・Ctrl PC のデスクトップから Shortcuts ショートカットをクリック。 ・pm16c1A2cntlpnl をクリック。以下のコントロールパネルが起動する。

<b>76</b> pr	m16	c1A2 Co	ontrol Par	nnel						-		×
Enable		Name	Status	Present		Absolute			Relative		Remote	Rem/Loc
N	0:	ch0	Stop	86	=>	86	Go	CCW(-)	0	CW(+)	SI	op
	1:	ch1	Stop	0	=>	0	Go	CCW(-)	0	CW(+)	SI	op
	2:	LASER	Stop	-3000	=>	-3000	Go	CCW(-)	0	CW(+)	SI	op
	3:	ch3	Stop 🗌	0	=>	0	Go	CCW(-)	0	CW(+)	SI	top
V	4:	ch4	Stop	0	=>	0	Go	CCW(·)	0	CW(+)	SI	iop
V	5:	BPMY	Stop 🗌	-200	=>	-200	Go	CCW(-)	100	CW(+)	SI	:op
	6:	BPMZ	Stop 🗌	45169	=>	45000	Go	CCW(-)	10	CW(+)	SI	op
V	7:	ch7	Stop	0	=>	0	Go	CCW(-)	0	CW(+)	SI	top
<b>N</b>	8:	S5H16	Stop	7574	=>	7574	Go	CCW(-)	0	CW(+)	SI	op
	9:	S5H14	Stop 🗌	-7527	=>	-7527	Go	CCW(-)	0	CW(+)	SI	op
	10:	S5U	Stop 🗌	6512	=>	6512	Go	CCW(-)	0	CW(+)	SI	op
	11:	S5L	Stop 🗌	-8204	=>	-8204	Go	CCW(-)	0	CW(+)	SI	op
V	12:	chC	Stop	0	=>	0	Go	CCW(·)	0	CW(+)	SI	iop
V	13:	chD	Stop	0	=>	0	Go	CCW(·)	0	CW(+)	SI	:op
V	14:	chE	Stop	0	=>	0	Go	CCW(·)	0	CW(+)	SI	top
V	15:	chF	Stop	0	=>	0	Go	CCW(-)	0	CW(+)	SI	top

・BPMZのAbsに45000を入れてGoを押してだいたいの位置までBPMを駆動させる。
・GI-PDもしくはuICで透過出力を確認し、BPMの窓枠にビームが入っていることを確認する。
・ロガーCH7(PLCOUT)の電圧値が0近辺になるように、Relに適切な数値を入れて、CW又はCCWを押して調整する(最後は5plsぐらいで調整、マイナス方向がバックラッシュ無し)。
・後はBPMアライメントをやって実際のビーム位置にBPMを合わせれば良い。

(BPMY はほぼゼロで大丈夫だが、BPM 窓枠にビームが触れているないか確認するために、 200pls ぐらい動かして透過出力に影響が無いか調べると良い。もし位置調整をしたい場合に は、2000pls 超ぐらい動かして、透過出力が切れるところを確認して中心決めすると良い)

### 補足)もし PLC に出力がちゃんと入っているか確認したい場合

・KV STUDIO Ver.7 を制御 PC のデスクトップにあるショートカットから起動する。ファイルから C¥USER¥...¥bl15a2\_RIGI.kpr を選択する。モニタ/シミュレータ→モニターモードを選択すると 実際の値が入ってくる。TM13(chA0 特殊データ)、TM17(chB0 特殊データ)で実際の上刃、 下刃の出力値を確認できる。確認終了後は Quit で KV STUDIO を落としておくこと!



## 3.BPM の通常調整(立ち上げ時以外はここから)

・Δ θ スキャン

利用するエネルギーに駆動した後、Unlock のチェックボックスにレ点を入れて、Beam Feedback を OFF にする。Run only dTheta scan を選択して、Start を押す。スキャンが完了したら、下の図 のような波形が出れば OK。

🔡 BL-15A Monochrometer Scan Software at the Photon Factory	X
Option Setting Help	
BL Intensity Monitor D PD	Single scan tool
Present Value 1.2035 Å	Select Axis Energy.eV Present 10302.01 eV
10302.01 eV	Plot Start 11880 eV
11.07056 <b>deg</b>	Final position End 11950 eV
dth1(Pulse) -2270 2200 Ge	G Move to Peak     Step     tev
Set Value	C Move to center of FWHM Integ 1 (sec)
mede	Custom
	© Move to differential peak
Energy	Purse of changed Culture
i without tuning without gap	
Run only dTheta scan by use of channel CH2	Comment
Unlock Beam Feedback ON OFF	Save extra copy of datafile to the folder:
BPM Alignment Start Stop	
	Start Stop
Start	
CH1: 44865 CH2: 11865 CH3: 0 CH4: 423 CH5: 0 CH6:	0 CH7· 0 CH8· 0
Input check Ok:	
anuplot graph	– O X
Ba Ba D P Ontions ▼ X Grid X 1 X 2 X 3	8 X 4 X 5
Data: Mono 180000	5Scan_2021-03-16_095714.txt(REL)
	CH2 Peak[CH2_REL]=40.000000
160000	Gravity[CH2 REL]=96.449009
140000	FWHMICH2 RELI=>566.740490 (HM1=-199.441277,HM2=367.299213)
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100000	
80000	
60000	
40000	
20000	
0	
-20000	
-1000 -500	0 500 1000
	Kelative(mm)
- 1072.46, 199184.	14

#### •BPM の位置調整

BPM Alignment の Start を押す。下の図のように、CH7 のグラフが直線になるよう、Setting of Beam Position Monitor で BPM アライメントの調整幅を変更する(変更方法は後ろの補足2を参 照のこと)。CH7 が±0.2 以下であることを確認する。±0.2 から外れているときは、再度 BPM Alignment の Start を押す。

BL-15A Monochrometer Scan Softwork	ware at the Photon Factory			-	
L Intensity Monitor	IC PD	Single	scan tool		
resent Value	1.2129 <b>Å</b>	Select #	xis Wavelength 💌	Present 1.21	29 angstr
10	221.97 eV	Plot		Start	angstr
11	.15583 <b>deg</b>	<ul> <li>Standard</li> <li>Final</li> </ul>	position	End	angstr
dth1(P	ulse) 28339	Go	ve to Peak	Step	angstr
Set Value			ve to center of FWHM	Integ	(sec)
mode		C Different	shapped CH2		
C Wavelength	10222	File Pre	fix		
C Energy	without tuning 🔽 with	out gap Comme	nt		
Run only dThe	eta scan by use of chann	nel CH2 💌	Start	Stop	
	BPM Alignmen Sta	rt Stop			
Start	Stop				
ress 'Get' hutton to rer	uest data				Get
	•				
can is disabled by BPM					
can is disabled by BPM.					~
can is disabled by BPM. gnuplot graph	V Grid V 1			- 0	×
can is disabled by BPM. gnuplot graph Graph Graph Coptions •	发 Grid 发 1 Data: E	19MTune 2021-03-16 09593	/ txt(ABS)	<b>−</b> □	×
scan is disabled by BPM. gnuplot graph ∰ ∰ ∰ Options ▼ 6000	从 Grid 从 1 Data: E	3PMTune_2021-03-16_095932	.txt(ABS)		×
scan is disabled by BPM. gnuplot graph	从 Grid 从 1 Data: E	3PMTune_2021-03-16_095932	.txt(ABS)	- п	×
acan is disabled by BPM. gnuplot graph ∰ ∰ ∰ Options ▼ 6000 4000	从 Grid 从 1 Data: E	3PMTune_2021-03-16_095932	e.txt(ABS)		×
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an is disabled by BPM. gnuplot graph GO00 4000 2000	从 Grid 从 1 Data: E	3PMTune_2021-03-16_095932	: txt(ABS)		×
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can is disabled by BPM.     gnuplot graph     G000     G000     G000     G000     G000     G0	∦ Grid ∦ 1 Data: E	3PMTune_2021-03-16_095932	e.txt(ABS)		×

## ・フィードバックを開始

Beam Feedback を ON。正常に BPM が動作していれば、CH7 の電圧値は 0V 付近にオフセットされる。OK なら Unlock のチェックボックスを選択する(下図)。以上で完了。

🚇 BL-15A Monochrometer Scan Software at the Photon Factory		- 🗆 ×
Option Setting		
BL Intensity Monitor IC PD	Single scan tool	
Present Value 1 2129 Å	Select Axis Wavelength	Present 1.2129 angstrom
10001.07	Plot	
10221.97 eV	<ul> <li>Standard</li> </ul>	Start angstrom
11.15583 <b>deg</b>	Final position	Step angstrom
dth1(Pulse) 28339 Go	• Move to Peak C Move to Gravity	Integ (sec)
Set Value	C Move to center of FWHM	
mode	C Differential	
	By use of channel 10H2	
C Enermy	File Prefix	
without tuning without gap		
© Run only dTheta scan by use of channel CH2 💌	Start	Stop
Beam Feedback ON OFF		
BPM Alignment Start Stop		
Start Stop		
Proce 'Got' button to request data		Get
Press det button to request data.		
Dth scan is disabled by BPM.		
Dth scan is disabled by BPM.       Image: BL-15A Monochrometer Scan Software at the Photon Factory		.:: X
Dth scan is disabled by BPM.		#. × □ -
Dth scan is disabled by BPM.       Image: BL Intensity Monitor         Image: Delta De	Single scan tool	::. X
Dth scan is disabled by BPM.       Image: BL-15A Monochrometer Scan Software at the Photon Factory       Option       Setting       Image: BL Intensity Monitor       Image: Present Value       1.2129	Single scan tool	: - □ × Present 12129 ansstrom
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# 補足1)BPM が正常に動作しているか、波長変更を行って確認する方法

例えば以下のように波長を1Åに変更してみると、BPM が正常に動作していれば、下図のよう に CH7 の電圧値が0になるように追随する。

Present Value       10000 Å         12399.48 eV       918178 deg         etn(Pulue)       2200 0         Value       918178 deg         etn(Pulue)       2200 0         Image: Status       For or o	😾 BL-15A Monochrometer Scan Software at the Photon Factory			
BL Intensity Wantor T P Protect Value 10000 Å 1239848 eV 918178 deg dth[Puke) -220 200 0 St Value	Option Setting Help	<u></u>		
Present Value 10000 Å 12398 48 eV 918173 deg dith(Pulse) -220 200 0 Set Value Set Value Set Value	BL Intensity Monitor 🛛 🛛 🛛 🛛 🛛 🕫	Single scan tool		
12398.48 eV         9.18178 deg         eth(Pube)       2200 000         Image prefere       Sert initio eV	Present Value 1.0000 Å	Select Axis Energy.eV	Present 12398	.48 eV
9.18178 deg dth(Pube) -220 200 0 Set Value	12398.48 eV	Plot	Start 11	880 eV
dthl(Pule)       -220       200       0         Set Value       Imag       (more)         Imag       (more) <t< th=""><th>9.18178 <b>deg</b></th><th>Final position</th><th>End 11</th><th>950 eV</th></t<>	9.18178 <b>deg</b>	Final position	End 11	950 eV
Set Value vertex constrained PWilk For organization of the sector of t	dth1(Pulse) -2270 2200 Ga	© Move to Peak	Step	1 eV
Image: State of the state	Set Value	C Move to center of FWHM	Integ	1 (sec)
indefinition in the transmission of		Custom		
Image: Serie Seri	mode	Move to differential peak		
Image: Contract of the state of the sta	• Wavelength 1	Move to middle of peak and bottom		
Find only dThata scan by use of channel [St?]         Comment         Star	without tuning without gap	By use of channel  CH4 -		
	C Run only dTheta scan by use of channel CH2 💌	File Prefix Au-L3		-
CH: 44885, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 CH: 44885, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 CH: 44885, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 CH: 44885, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 CH: 44895, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 CH: 44895, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11885, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH5: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH2: 0, CH2: 0, CH2: 0 CH: 44895, CH2: 11895, CH2: 0, CH4: 423, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0, CH2: 0, CH2: 0, CH2: 0 CH2: 0, CH2: 0	Unlock Beam Feedback ON OFF	Save extra copy of datafile to the fol	lder:	
	BPM Alignment Start Stop	I		
		Start	Stop	
CH: 44865, CH2: 11865, CH2: 0, CH4: 423, CH5: 0, CH2:	Start Stop			
CH1: 44865, CH2: 11865, CH2: 0, CH4: 423, CH5: 0, CH7: 0, CH2: 0 can finiched:				
cm: 44edu, CH2: 118ed, CH3: 0, CH3: 0	QUIT. 44085 QUID. 11985 QUID. 0. QUIA. 403 QUIS. 0. QUIR. 0. QUI	7. 0. 0119. 0		01 1
	GH1: 44863, GH2: 11863, GH3: 0, GH4: 42a, GH3: 0, GH6: 0, GH			Get
	Scan finished.		IN ALL PLANKS R	
	Nore     Nore     Nore     Nore       2021/03/12 92437     00E1004/1000/00E     1085E1784065/14E     0       YTT表示     YTT表示     YTT表示     FYTAC     FYDULAT       400     電圧がOV/に       400     なるうとする       800     波長変更       300     スタート       900     日の       900     スタート       900     日の       100     日の       900     日の       900     スタート       900     日の       900     100       900     100	500 KB/S KING KING KING KING KING KING KING KING	2     3     4       32     3     4       103     V       104     V       105     -       104     V       104     -       105     -       104     -       104     -       104     -       104     -       105     -       104     -       105     -       106     -       107     -       108     -       109     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001     -       1001	

## 補足2) BPM アライメントの調整幅の変更方法

・Setting から BPM Scan Setting を選択する。

BL-15A Monochrometer Scan Software at the Photon Factory	- 🗆 X
Option Setting	
BL Intensity Monitor IC PD	Single scan tool
Present Value 1.2129 Å	Select Axis Wavelength  Present 1.2129 angstrom
10221.97 eV	Plot Start angstrom
11.15583 <b>deg</b>	Standard     End     angstrom
dth1(Pulse) 28339 Go	Image: Move to Peak     Step     angstrom       Move to Gravity     Integ     (sec)
mode	C Differential
Wavelength       10222         Energy       without tuning         Run only dTheta scan       by use of channel         CH2          Unlock       Beam Feedback         ON       OFF         DPM Alignment       Start         Start       Stop	File Prefix Comment Start Stop
Press 'Get' button to request data.	Get
Dth scan is disabled by BPM.	

•Setting of Beam Position Monitor が起動する。BPMZの中心付近の値(CH7の電圧値が0近辺になる時の BPMZの値)に対して、Start pls に+200、plsに-200の値を入れて Ok を押して設定する。あとは Alignment のグラフを見て直線になっているかで適切かどうか判断する。

BPM ]	Start pls OFF pls	Step pls	10
Scan param	45470 451	- 1	10
ſ			