

# PVDIS DAQ

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# Outline

- Merging PVDIS with HAPPEX DAQ
- Compare scaler readings of PVDIS with HAPPEX
- Plans in the coming experiments








































































































































# Merging PVDIS with HAPPEX DAQ

## MOTIVATION

- Allow PVDIS to include information from beam-line, such as BPMs, BCMs, Lumis, etc
- Helicity will be delayed, read it in injector crate as during HAPPEX
- Can use parity analyzer which is an already well developed code. PVDIS scalers, which count electrons, pions, will “look like” a detector based on a scaler in PAN

# Merging PVDIS with HAPPEX DAQ

## R-Tree

 disrew6	 disrew6r	 disrew7	 disrew7r	 disrew8	 disrew8r
 disrewc3	 disrewc3r	 disrewc4	 disrewc4r	 disrewc5	 disrewc5r
 disrewc8	 disrewc8r	 disrmxd1	 disrmxd1r	 disrmxd2	 disrmxd2r
 disrmxd5	 disrmxd5r	 disrmxd6	 disrmxd6r	 disrmxd7	 disrmxd7r
 disrmxdc2	 disrmxdc2r	 disrmxdc3	 disrmxdc3r	 disrmxdc4	 disrmxdc4r
 disrmxdc7	 disrmxdc7r	 disrmxdc8	 disrmxdc8r	 disrpn1	 disrpn1r
 disrpn4	 disrpn4r	 disrpn5	 disrpn5r	 disrpn6	 disrpn6r
 disrpnc1	 disrpnc1r	 disrpnc2	 disrpnc2r	 disrpnc3	 disrpnc3r
 disrpnc6	 disrpnc6r	 disrpnc7	 disrpnc7r	 disrpnc8	 disrpnc8r
 disrps3	 disrps3r	 disrps4	 disrps4r	 disrps5	 disrps5r
 disrps8	 disrps8r	 disrpsc1	 disrpsc1r	 disrpsc2	 disrpsc2r
 disrpsc5	 disrpsc5r	 disrpsc6	 disrpsc6r	 disrpsc7	 disrpsc7r
 disrpw2	 disrpw2r	 disrpw3	 disrpw3r	 disrpw4	 disrpw4r
 disrpw7	 disrpw7r	 disrpw8	 disrpw8r	 disrpwc1	 disrpwc1r
 disrpwc4	 disrpwc4r	 disrpwc5	 disrpwc5r	 disrpwc6	 disrpwc6r
 disrtg1	 disrtg1r	 disrtg2	 disrtg2r	 disrtg3	 disrtg3r
 disrtg6	 disrtg6r	 disrtg7	 disrtg7r	 disrtg8	 disrtg8r
 disrtgc3	 disrtgc3r	 disrtgc4	 disrtgc4r	 disrtgc5	 disrtgc5r
 disrtgc8	 disrtgc8r	 disrts1	 disrts1r	 disrts2	 disrts2r
 disrts5	 disrts5r	 disrts6	 disrts6r	 disrts7	 disrts7r
 disrtsc2	 disrtsc2r	 disrtsc3	 disrtsc3r	 disrtsc4	 disrtsc4r
 disrtsc7	 disrtsc7r	 disrtsc8	 disrtsc8r	 ev_num	 helicity
 oversample3	 pairsynch	 pairsynch3	 pitadac	 pitadac3	 precdac
 rampdelay3	 rsync1	 rsync2	 scaler0_0	 scaler0_0_cal	 scaler0_1

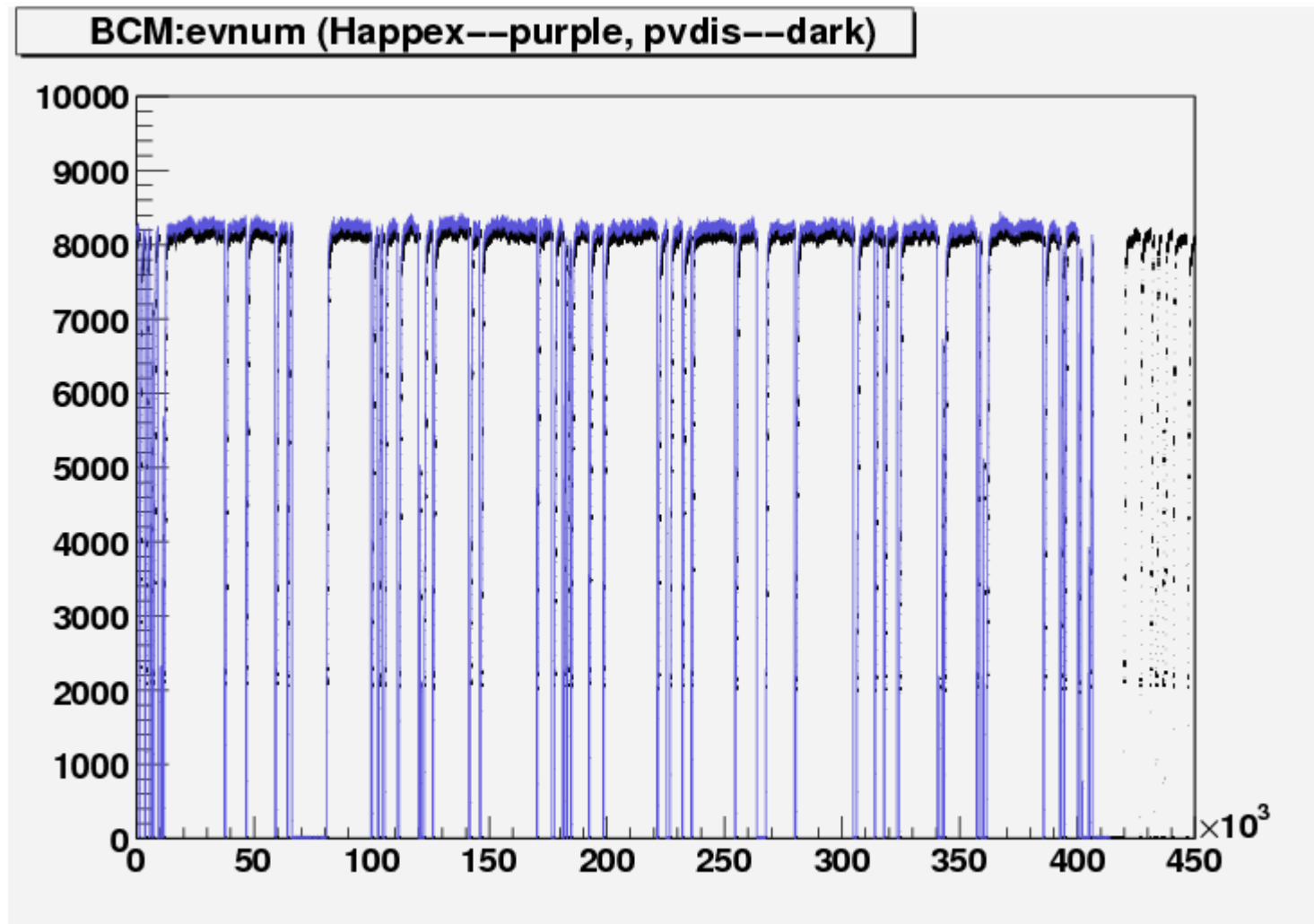
# Merging PVDIS with HAPPEX DAQ

## P-Tree

-  asym\_disrts4
-  asym\_disrts4c
-  asym\_n\_blumi4
-  asym\_n\_blumi\_d2
-  asym\_n\_disren4
-  asym\_n\_disrenc4
-  asym\_n\_disrew4
-  asym\_n\_disrewc4
-  asym\_n\_disrmtx4
-  asym\_n\_disrmtxdc4
-  asym\_n\_disrpn4
-  asym\_n\_disrpsc4
-  asym\_n\_disrps4
-  asym\_n\_disrpsc4
-  asym\_n\_disrpw4
-  asym\_n\_disrpwc4
-  asym\_n\_disrtg4
-  asym\_n\_disrtgc4
-  asym\_n\_disrts4
-  asym\_n\_disrts4c
-  avg\_bcm4
-  avg\_bcmcav3
-  avg\_blumi8
-  asym\_disrts5
-  asym\_disrts5c
-  asym\_n\_blumi5
-  asym\_n\_blumi\_h
-  asym\_n\_disren5
-  asym\_n\_disrenc5
-  asym\_n\_disrew5
-  asym\_n\_disrewc5
-  asym\_n\_disrmtx5
-  asym\_n\_disrmtxdc5
-  asym\_n\_disrpn5
-  asym\_n\_disrpsc5
-  asym\_n\_disrps5
-  asym\_n\_disrpsc5
-  asym\_n\_disrpw5
-  asym\_n\_disrpwc5
-  asym\_n\_disrtg5
-  asym\_n\_disrtgc5
-  asym\_n\_disrts5
-  asym\_n\_disrts5c
-  avg\_bcm5
-  avg\_blumi1
-  avg\_blumi\_c
-  asym\_disrts6
-  asym\_disrts6c
-  asym\_n\_blumi6
-  asym\_n\_blumi\_sum
-  asym\_n\_disren6
-  asym\_n\_disrenc6
-  asym\_n\_disrew6
-  asym\_n\_disrewc6
-  asym\_n\_disrmtx6
-  asym\_n\_disrmtxdc6
-  asym\_n\_disrpn6
-  asym\_n\_disrpsc6
-  asym\_n\_disrps6
-  asym\_n\_disrpsc6
-  asym\_n\_disrpw6
-  asym\_n\_disrpwc6
-  asym\_n\_disrtg6
-  asym\_n\_disrtgc6
-  asym\_n\_disrts6
-  asym\_n\_disrts6c
-  avg\_bcm6
-  avg\_blumi2
-  avg\_blumi\_d1
-  asym\_disrts7
-  asym\_disrts7c
-  asym\_n\_blumi7
-  asym\_n\_blumi\_v
-  asym\_n\_disren7
-  asym\_n\_disrenc7
-  asym\_n\_disrew7
-  asym\_n\_disrewc7
-  asym\_n\_disrmtx7
-  asym\_n\_disrmtxdc7
-  asym\_n\_disrpn7
-  asym\_n\_disrpsc7
-  asym\_n\_disrps7
-  asym\_n\_disrpsc7
-  asym\_n\_disrpw7
-  asym\_n\_disrpwc7
-  asym\_n\_disrtg7
-  asym\_n\_disrtgc7
-  asym\_n\_disrts7
-  asym\_n\_disrts7c
-  avg\_bcm7
-  avg\_blumi3
-  avg\_blumi\_d2
-  asym\_disrts8
-  asym\_disrts8c
-  asym\_n\_blumi8
-  asym\_n\_blumi\_x
-  asym\_n\_disren8
-  asym\_n\_disrenc8
-  asym\_n\_disrew8
-  asym\_n\_disrewc8
-  asym\_n\_disrmtx8
-  asym\_n\_disrmtxdc8
-  asym\_n\_disrpn8
-  asym\_n\_disrpsc8
-  asym\_n\_disrps8
-  asym\_n\_disrpsc8
-  asym\_n\_disrpw8
-  asym\_n\_disrpwc8
-  asym\_n\_disrtg8
-  asym\_n\_disrtgc8
-  asym\_n\_disrts8
-  asym\_n\_disrts8c
-  avg\_bcm8
-  avg\_blumi4
-  avg\_blumi\_h
-  asym\_disrts1
-  asym\_n\_blumi1
-  asym\_n\_blumi\_ave
-  asym\_n\_disren1
-  asym\_n\_disrenc1
-  asym\_n\_disrew1
-  asym\_n\_disrewc1
-  asym\_n\_disrmtx1
-  asym\_n\_disrmtxdc1
-  asym\_n\_disrpn1
-  asym\_n\_disrpsc1
-  asym\_n\_disrps1
-  asym\_n\_disrpsc1
-  asym\_n\_disrpw1
-  asym\_n\_disrpwc1
-  asym\_n\_disrtg1
-  asym\_n\_disrtgc1
-  asym\_n\_disrts1
-  asym\_n\_disrts1c
-  avg\_bcm1
-  avg\_bcm9
-  avg\_blumi5
-  avg\_blumi\_sum

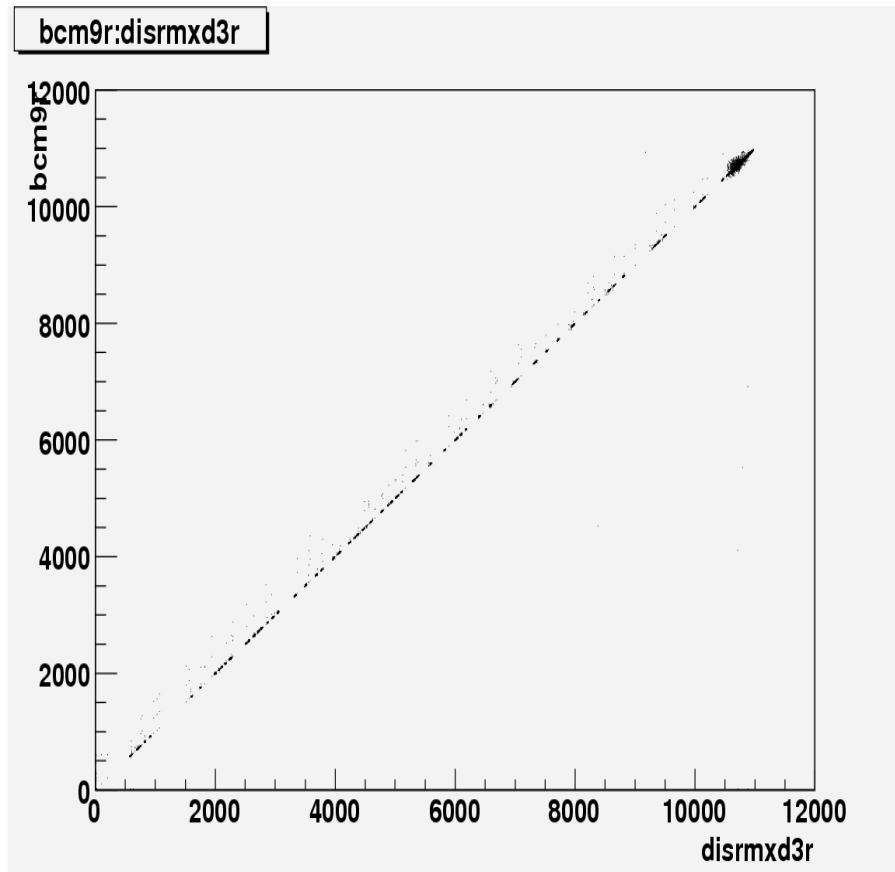
# Compare PVDIS and HAPPEX Scaler readings

Before integration, use a standalone code to read out PVDIS scalers and compare with HAPPEX



# Compare PVDIS and HAPPEX Scaler readings

Now, use PAN to read out and compare scalers in both DAQs



here, bcm9r is equal to scaler4\_26, disrmd3r = scaler7\_26

ev_num	helicity	bcm9r	v2f_clk4	disrmd3r	v2f_clk7
* 75 *	0 *	10917 *	1122 *	10918 *	3398 *
* 76 *	0 *	10918 *	1124 *	10918 *	3398 *
* 77 *	1 *	10914 *	1124 *	10918 *	3398 *
* 78 *	1 *	10925 *	1124 *	10924 *	3398 *
* 79 *	0 *	10918 *	1127 *	10924 *	3398 *
* 80 *	1 *	10912 *	1122 *	10924 *	3398 *
* 81 *	0 *	10906 *	1122 *	10907 *	3398 *
* 82 *	0 *	10907 *	1125 *	10907 *	3398 *
* 83 *	1 *	10907 *	1126 *	10907 *	3398 *
* 84 *	1 *	10909 *	1124 *	10909 *	3398 *
* 85 *	0 *	10909 *	1124 *	10909 *	3398 *
* 86 *	0 *	10909 *	1125 *	10909 *	3398 *
* 87 *	1 *	10907 *	1123 *	10906 *	3398 *
* 88 *	0 *	10913 *	1124 *	10906 *	3398 *
* 89 *	1 *	10911 *	1123 *	10906 *	3398 *
* 90 *	1 *	10915 *	1122 *	10915 *	3398 *
* 91 *	0 *	10909 *	1125 *	10915 *	3398 *
* 92 *	0 *	10913 *	1124 *	10915 *	3398 *
* 93 *	1 *	10914 *	1127 *	10914 *	3397 *
* 94 *	1 *	10922 *	1124 *	10914 *	3397 *
* 95 *	0 *	10909 *	1122 *	10914 *	3397 *
* 96 *	1 *	10902 *	1126 *	10902 *	3397 *
* 97 *	0 *	10900 *	1125 *	10902 *	3397 *
* 98 *	0 *	10902 *	1122 *	10902 *	3397 *
* 99 *	1 *	10890 *	1120 *	10891 *	3398 *

**PROBLEM!!**

# Compare PVDIS and HAPPEX Scaler readings

To try to repeat and solve the 3-same-reading problem, sent 100kHz pulser, Ramping DAC 12 after v2f into scalers of both DAQs

#31120

	ev_num	scaler4_0:	scaler6_0:	scaler7_0:	scaler8_0:	scaler9_0
*	1000	* 3386	* 3335	* 3335	* 3335	* 3335
*	1001	* 3384	* 3335	* 3335	* 3335	* 3335
*	1002	* 3386	* 3335	* 3335	* 3335	* 3335
*	1003	* 3385	* 3335	* 3335	* 3335	* 3335
*	1004	* 3384	* 3335	* 3335	* 3335	* 3335
*	1005	* 3386	* 3335	* 3335	* 3335	* 3335
*	1006	* 3385	* 3335	* 3335	* 3335	* 3335
*	1007	* 3385	* 3335	* 3335	* 3335	* 3335
*	1008	* 3385	* 3336	* 3336	* 3336	* 3336
*	1009	* 3385	* 3334	* 3334	* 3334	* 3334
*	1010	* 3385	* 3335	* 3335	* 3335	* 3335
*	1011	* 3385	* 3336	* 3336	* 3336	* 3336
*	1012	* 3385	* 3335	* 3335	* 3335	* 3335
*	1013	* 3385	* 3335	* 3335	* 3335	* 3335
*	1014	* 3385	* 3335	* 3335	* 3335	* 3335
*	1015	* 3385	* 3335	* 3335	* 3335	* 3335
*	1016	* 3385	* 3335	* 3335	* 3335	* 3335
*	1017	* 3385	* 3335	* 3335	* 3335	* 3335
*	1018	* 3385	* 3335	* 3335	* 3335	* 3335
*	1019	* 3385	* 3335	* 3335	* 3335	* 3335
*	1020	* 3385	* 3335	* 3335	* 3335	* 3335
*	1021	* 3385	* 3335	* 3335	* 3335	* 3335
*	1022	* 3385	* 3335	* 3335	* 3335	* 3335
*	1023	* 3385	* 3335	* 3335	* 3335	* 3335
*	1024	* 3386	* 3335	* 3335	* 3335	* 3335

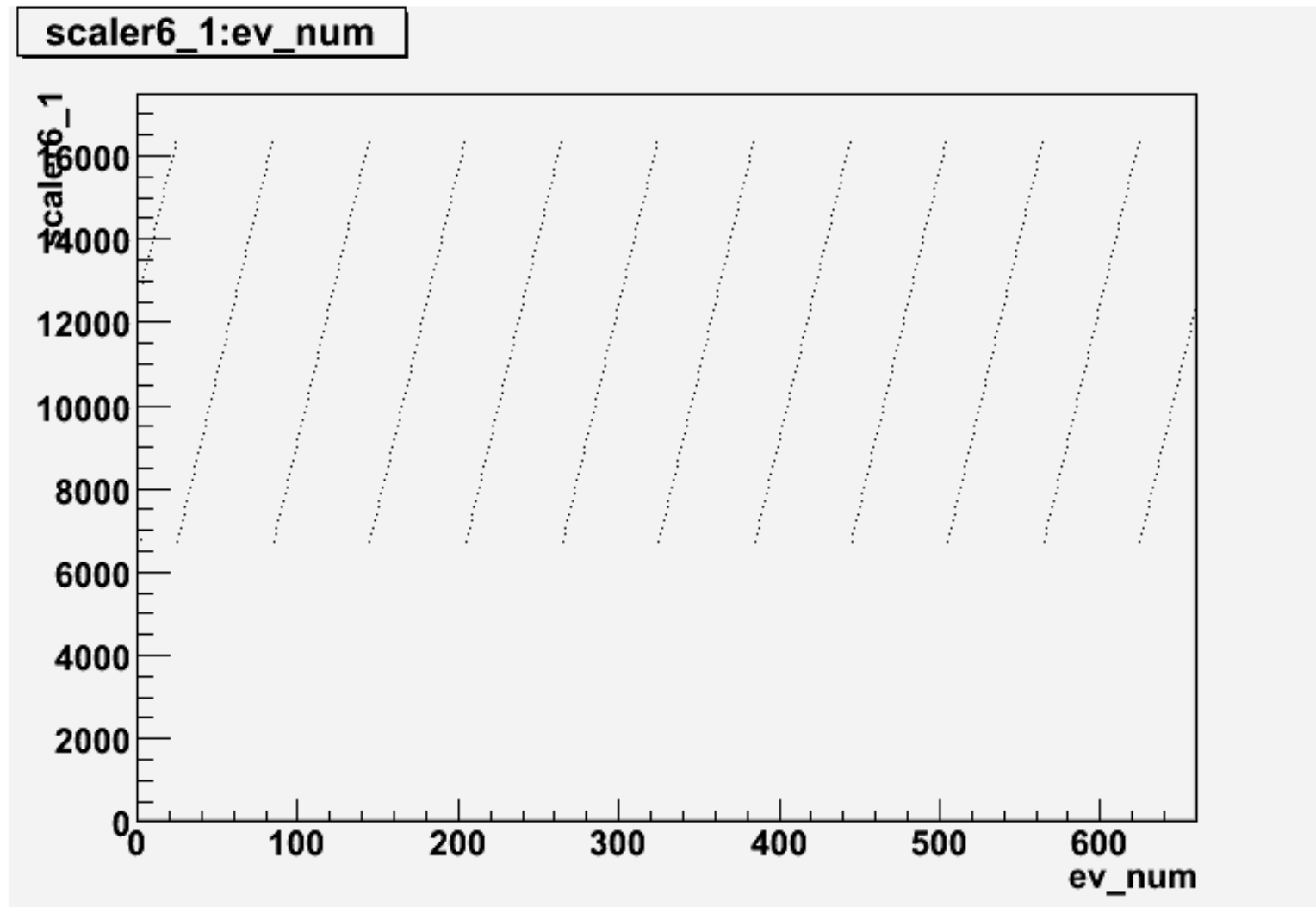
100 kHz pulser

Scaler4 ungated



# Compare PVDIS and HAPPEX Scaler readings

To try to repeat and solve the 3-same-reading problem, sent 100kHz pulser, Ramping DAC 12 after v2f into scalers of both DAQs,



# Compare PVDIS and HAPPEX Scaler readings

To try to repeat and solve the 3-same-reading problem, sent 100kHz pulser, Ramping DAC 12 after v2f into scalers of both DAQs, helicity after v2f for synchronization check

```
#31185  ramping DAC 12 --->v2f chan1---> scaler4_1, scaler6_1, scaler7_1  
        helicity---> not OUT ---> v2f chan2---> scaler4_2, scaler6_2, scaler7_2
```

	ev_num:	scaler4_1:	scaler6_1:	scaler7_1:	scaler4_2:	scaler6_2:	scaler7_2
*	400 *	6841 *	6740 *	6841 *	15979 *	5868 *	5950 *
*	401 *	6841 *	6740 *	6841 *	16052 *	15809 *	16043 *
*	402 *	6840 *	6739 *	6840 *	5254 *	15815 *	16052 *
*	403 *	6841 *	6740 *	6841 *	5949 *	5106 *	5186 *
*	404 *	6841 *	6740 *	6841 *	15979 *	5871 *	5953 *
*	405 *	6841 *	6740 *	6841 *	16051 *	15810 *	16044 *
*	406 *	6840 *	6739 *	6840 *	5255 *	15814 *	16051 *
*	407 *	6841 *	6739 *	6841 *	15979 *	5105 *	5185 *
*	408 *	6841 *	6740 *	6841 *	5253 *	15815 *	16048 *
*	409 *	6841 *	6740 *	6841 *	5948 *	5104 *	5184 *
*	410 *	6840 *	6739 *	6840 *	15979 *	5871 *	5953 *
*	411 *	6841 *	6740 *	6841 *	5249 *	15809 *	16043 *
*	412 *	6841 *	6740 *	6841 *	15975 *	5100 *	5180 *
*	413 *	6841 *	6740 *	6841 *	16053 *	15813 *	16045 *
*	414 *	6841 *	6740 *	6841 *	5255 *	15815 *	16052 *
*	415 *	6840 *	6739 *	6840 *	15980 *	5106 *	5187 *
*	416 *	6841 *	6740 *	6841 *	5255 *	15817 *	16049 *
*	417 *	6841 *	6740 *	6841 *	5950 *	5106 *	5186 *
*	418 *	6841 *	6740 *	6841 *	15980 *	5872 *	5954 *
*	419 *	6841 *	6739 *	6840 *	16051 *	15809 *	16044 *
*	420 *	6840 *	6739 *	6841 *	5253 *	15815 *	16052 *
*	421 *	6841 *	6740 *	6841 *	5947 *	5103 *	5183 *
*	422 *	6841 *	6740 *	6841 *	15979 *	5869 *	5952 *
*	423 *	6841 *	6739 *	6840 *	5251 *	15810 *	16044 *
*	424 *	6840 *	6739 *	6841 *	15976 *	5101 *	5181 *

Scaler 6 gated

Scaler4,7 ungated

# Plans during the incoming experiments

- 1, Continue helicity synchronization check
- 2, Repeat the above check for every channel of all the scalars
- 3, Prepare the parasitic test during  $A_y$  and  $^3\text{He}(e,e'd)$  experiments