

SBS DAQ update

November 23rd 2020

Outline

- Bigbite
 - Shower
 - GRINCH
 - Hodoscope
 - GEM
- Superbigbite
 - HCAL
 - Recoil polarimeter
 - CDet
- LHRS
- Cabling

SBS configuration GMn/Gen/Gen RP

		Channels	Modules	Nb modules
BigBite	Shower	189	FADC	12
	Preshower	54	FADC	4
	Scintillator	180	V1190	2
	Cerenkov	550	VETROC	6
	GEM INFN	14000	MPD	24
	GEM UVA	113000	MPD	77
BigBen	HCAL	288	FADC	18
	CDet	2520	VETROC	13
HRS	S2m	32	FADC	2
	S0	2	FADC	1
	Cerenkov	10	FADC	1
	PRL	68	FADC	4
	VDC	1536	1877	16
	Raster	4	FADC	1
	BPM	8	FADC	1
RP	Proton Large Angle	96	FADC	6
	Active analyzer	32	FADC	2
09/28/2020			SBS meeting TDC	1

Shower

- 243 channels lead glass
- FADC readout : 10 FADC from electronics group + 6 Glasgow FADC about to be ordered
- VXS crate ordered
- SoLID crate for testing with 4 FADC and VTP
- Need add TDC for sums : F1
- Fastbus testing with cosmics
- CODA3 setup on going

Grinch

- 550 channels with NINO
- VXS crate, TI and SD
- 6 VETROC readout
- CODA3 setup
- Need VTP for Cerenkov trigger

Hodoscope

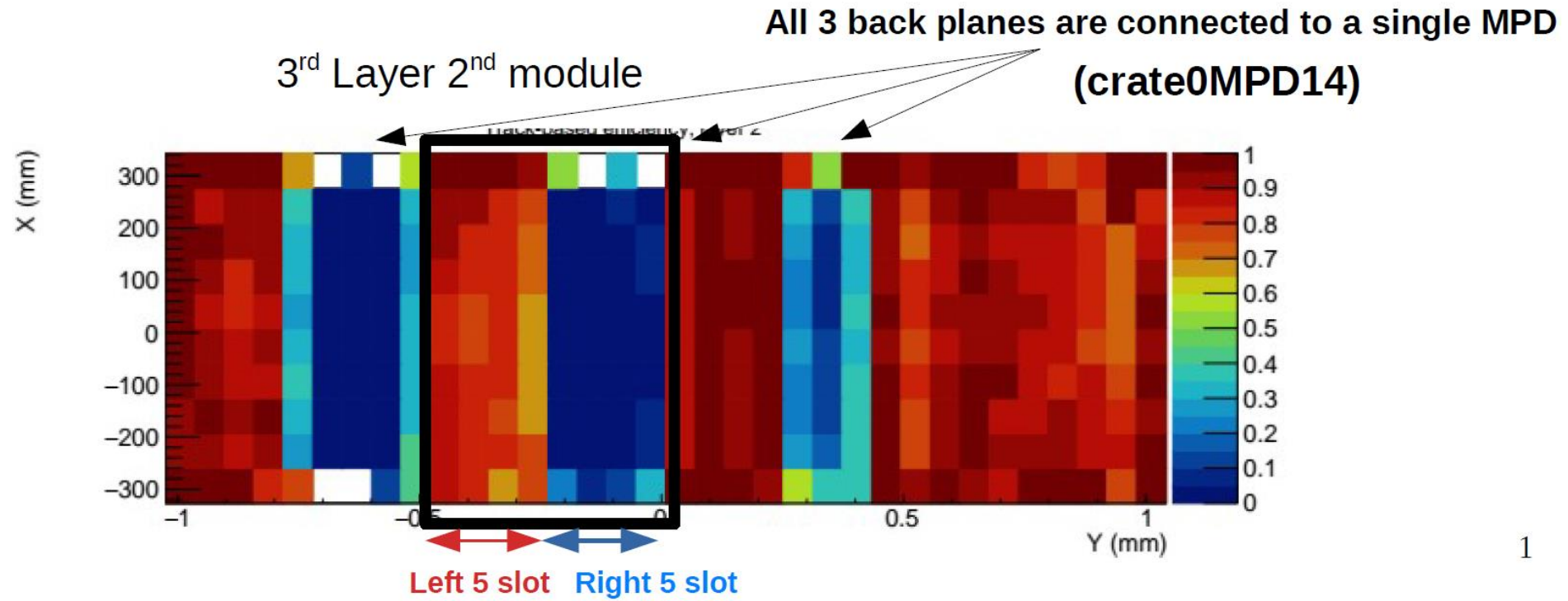
- 200 channels scintillator readout with NINO
- CAEN TDC V1190
- 1 VME64X crate with TI

- CODA3 being setup

GEM

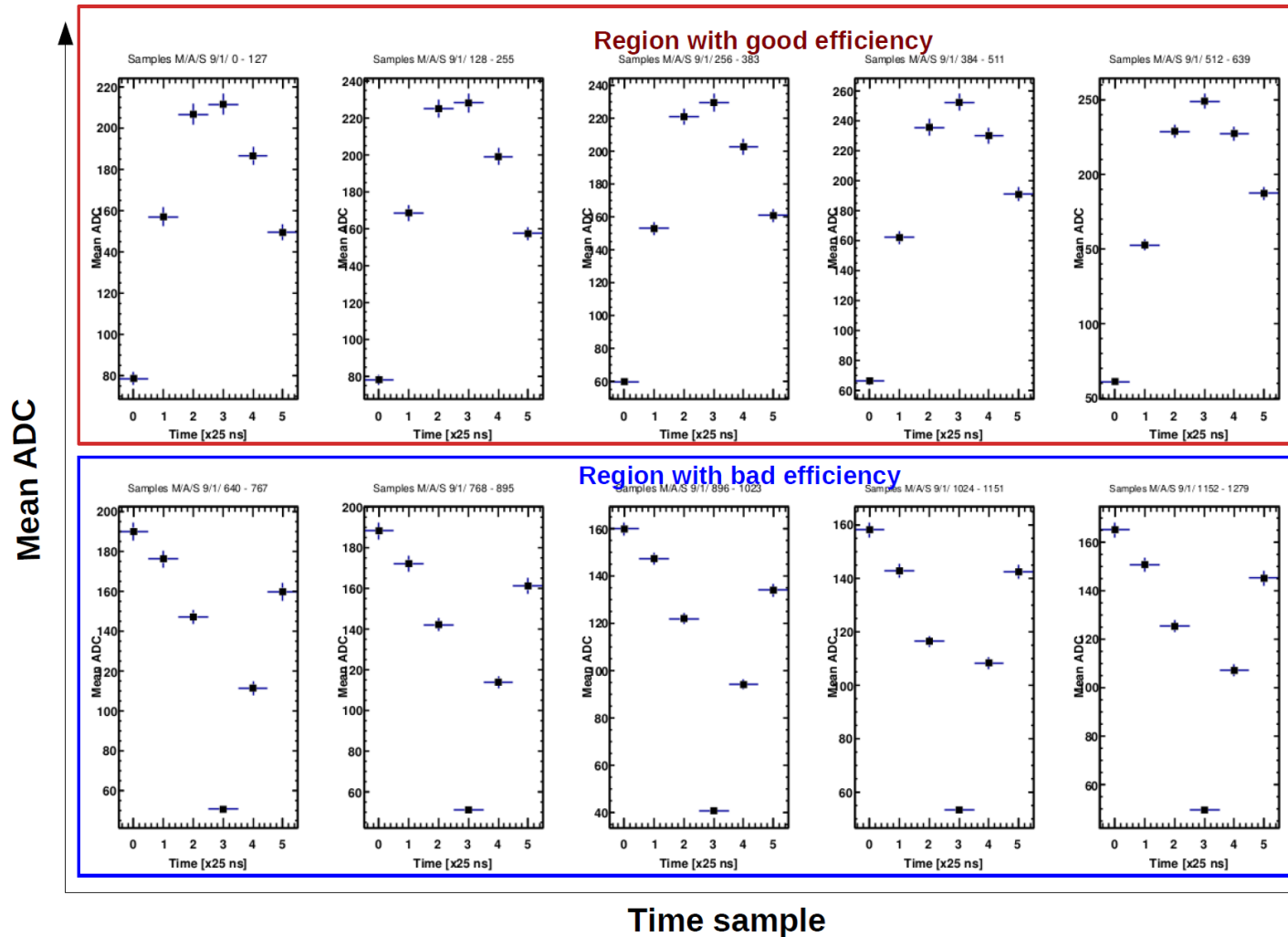
- UVA clean room
 - Taking cosmics using VME readout
 - CODA3 setup
 - Optical readout set up but not in use
 - Issue of low efficiency in some module being investigated
- INFN clean room
 - Taking cosmics using VME readout
 - Optical readout set up but not in use
 - Instabilities issues solved with hardware replacement and increase of low voltage
 - Starting using CODA3

GEM continued



GEM continued

ADC vs time



GEM continued

- BB GEM setup
 - 1 VME crate
 - 1 VXS crate with SSP TI and SD
- GEM readout being setup on tedbbdaq
- Space in TEDF being cleaned up for GEM layer installation in BigBite in December

GEM

MPD optical output

For each trigger an MPD sends:

$$128\text{ch} \times 6\text{samples} \times 15\text{APV}/25 = 11520 \text{ 32bit words} \Rightarrow 11520 \times 32\text{b} \times 10\text{b}/8\text{b} = 460800\text{bit}$$

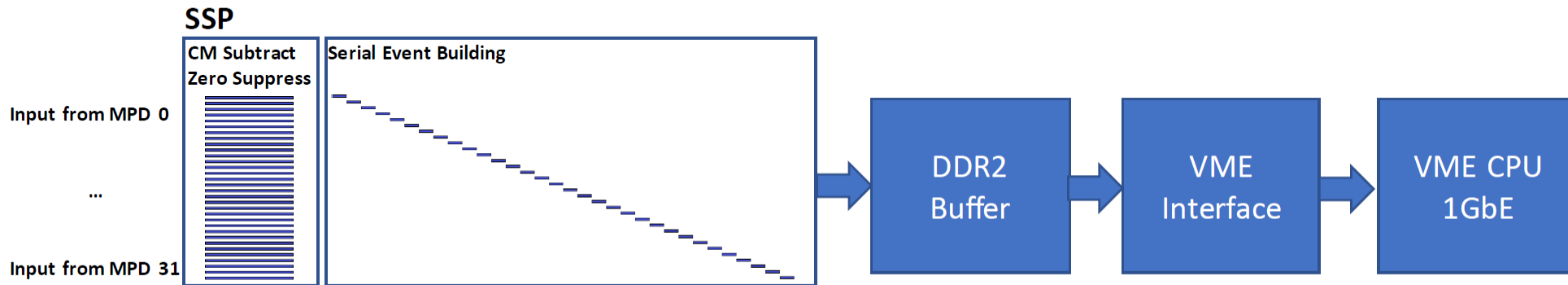
At 2.50Gbps => 185μs per event => 5.4kHz limit

At 1.25Gbps => 370μs per event => 2.7kHz limit

- We had to lower from 2.5Gbps -> 1.25Gbps after realizing large jitter on MPD data transmission.
- At 1.25Gbps link is reliable, but we need to pack 2 samples per 32bit on MPD data to go back to 5.4kHz limit

On the SSP, common-mode/zero suppression is processed on all 32 fibers from MPD in parallel, but was event building result in serial:

442kB per event from SSP (32 MPD, 100% occupancy)
132kB per event from SSP (32 MPD, 30% occupancy)



				Trig rate limit (30% occupancy, 32MPD, 15APV)	MPD Limit (30% occupancy, 4.5kHz, 15APV)
Previous (w/2.5Gbps links):	125MB/s throughput	200MB/s 2eSST	~100MB/s throughput	754Hz	5
Previous (w/1.25Gbps links):	62.5MB/s throughput	200MB/s 2eSST	~100MB/s throughput	471Hz	Not possible

HCAL

- 288 channels
- FADC readout : 16 + 2 FADC
- 5 F1 TDCs

- CODA3 setup

- Taking cosmics and LED

- Warning message being investigated

Recoil polarimeter

- 96 + 32 channels
- FADC readout

- Crate will be installed in Bigbite weldment

CDet

- 2520 channels
- MAPMT readout and NINO readout
- Fastbus for testing
- VETROC ordered
- VXS ordered
- Starting CODA3 setup and testing VETROC

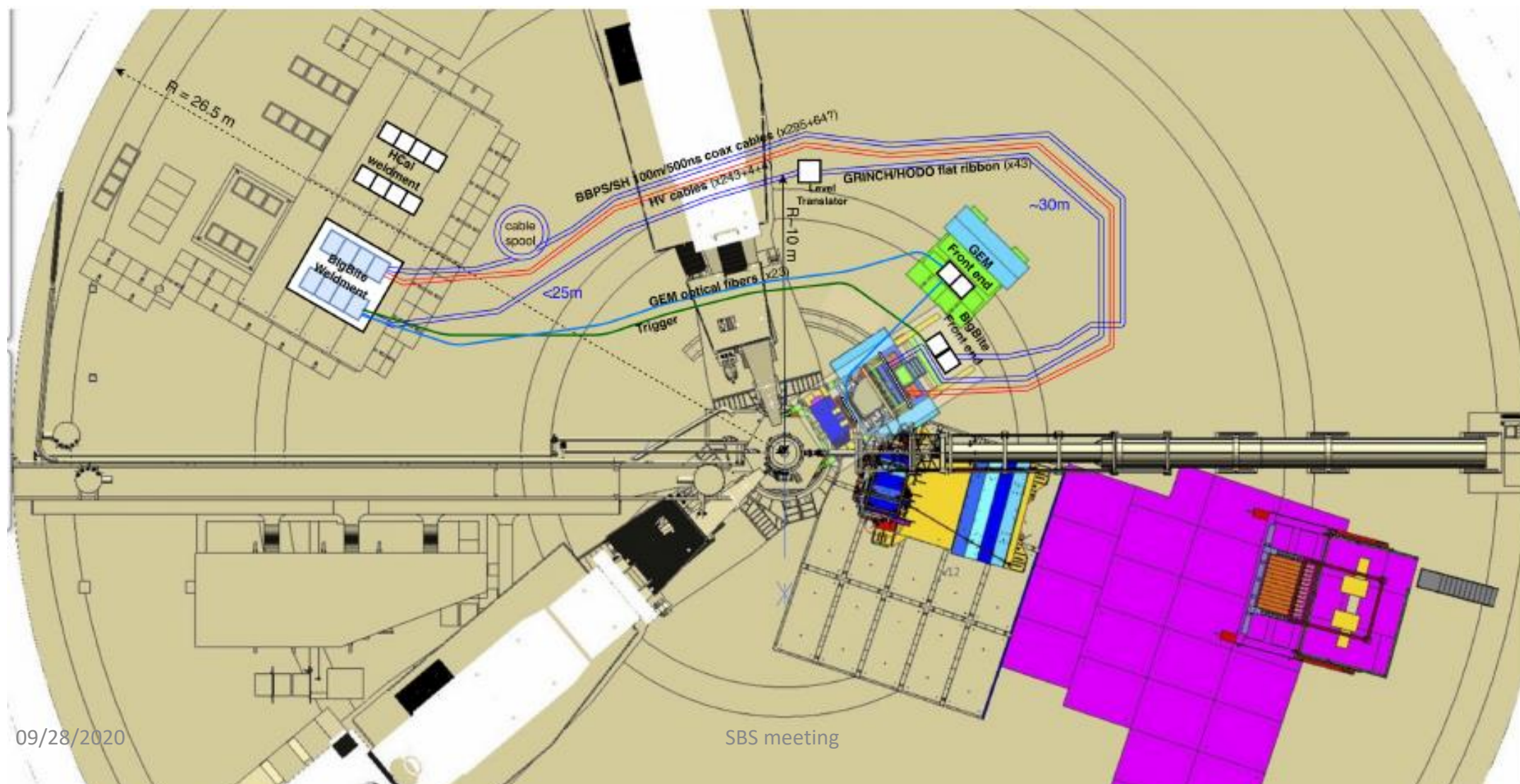
LHRS

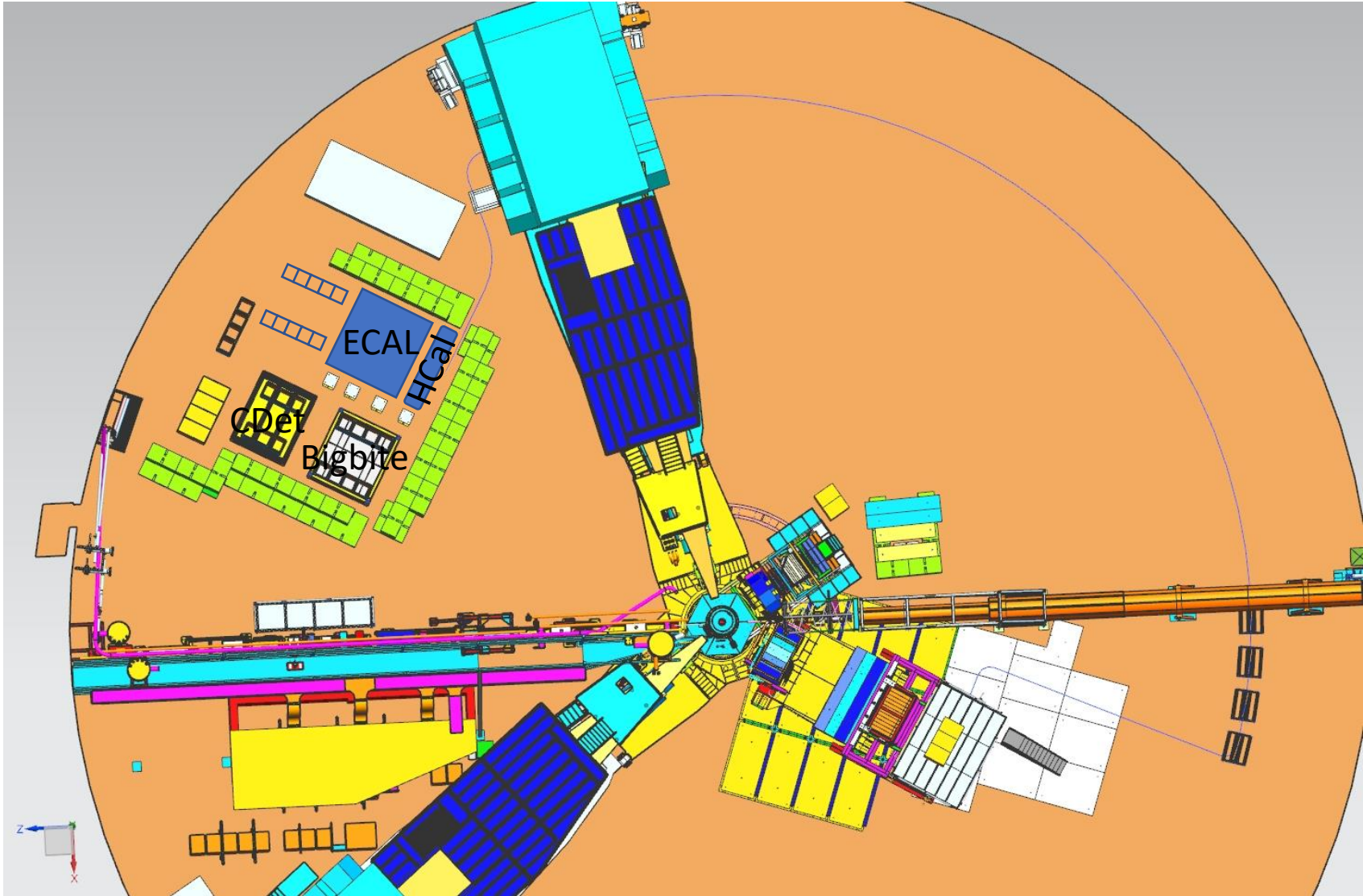
- S0 2PMTs : FADC
- S2m 16 PMTs : FADC
- PRL 68 channels : FADC
- 768 VDC channels : 3 Fastbus

- Upgrading to CODA3, intel CPU and new TI

- Need fiber trunk for TI fiber installed

Hall Layout

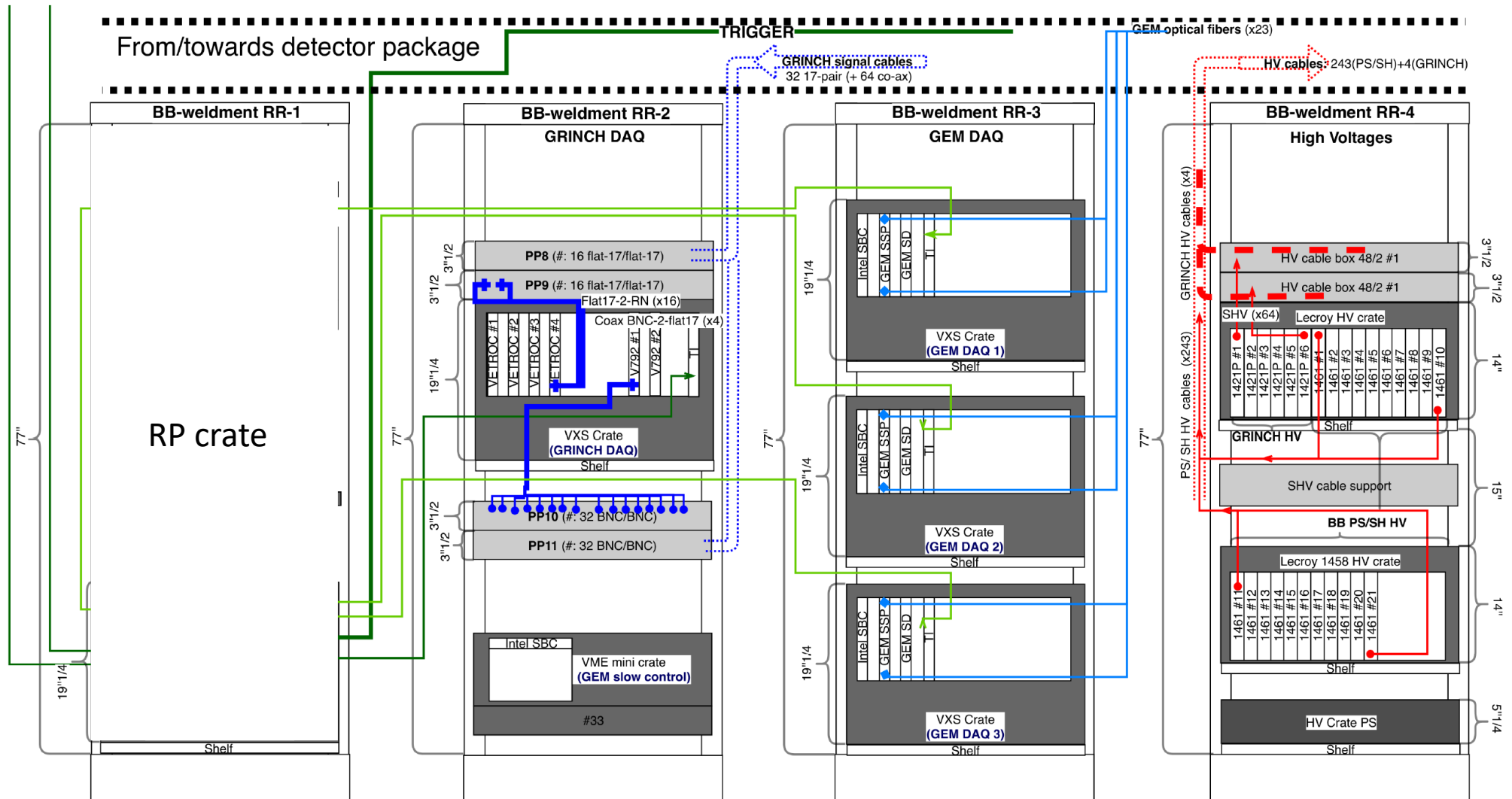




Cable list

- <https://docs.google.com/spreadsheets/d/1gPhDCgyxigeVbjGXxMINCIUUzg42ZZZJy8PBZF-zLAc/edit?usp=sharing>

Cable and rack layout from Eric



Bigbite weldment cable trays

