

# HRS DAQ

Alexandre Camsonne

GMp meeting

September 24<sup>th</sup> 2012

# Detectors

## Left arm

- S0 (2)
- 1<sup>st</sup> FPP chamber(318)
- Gas Cerenkov(10)
- S2m(32)
- Pion rejector 1(34)
- Pion rejector 2(34)

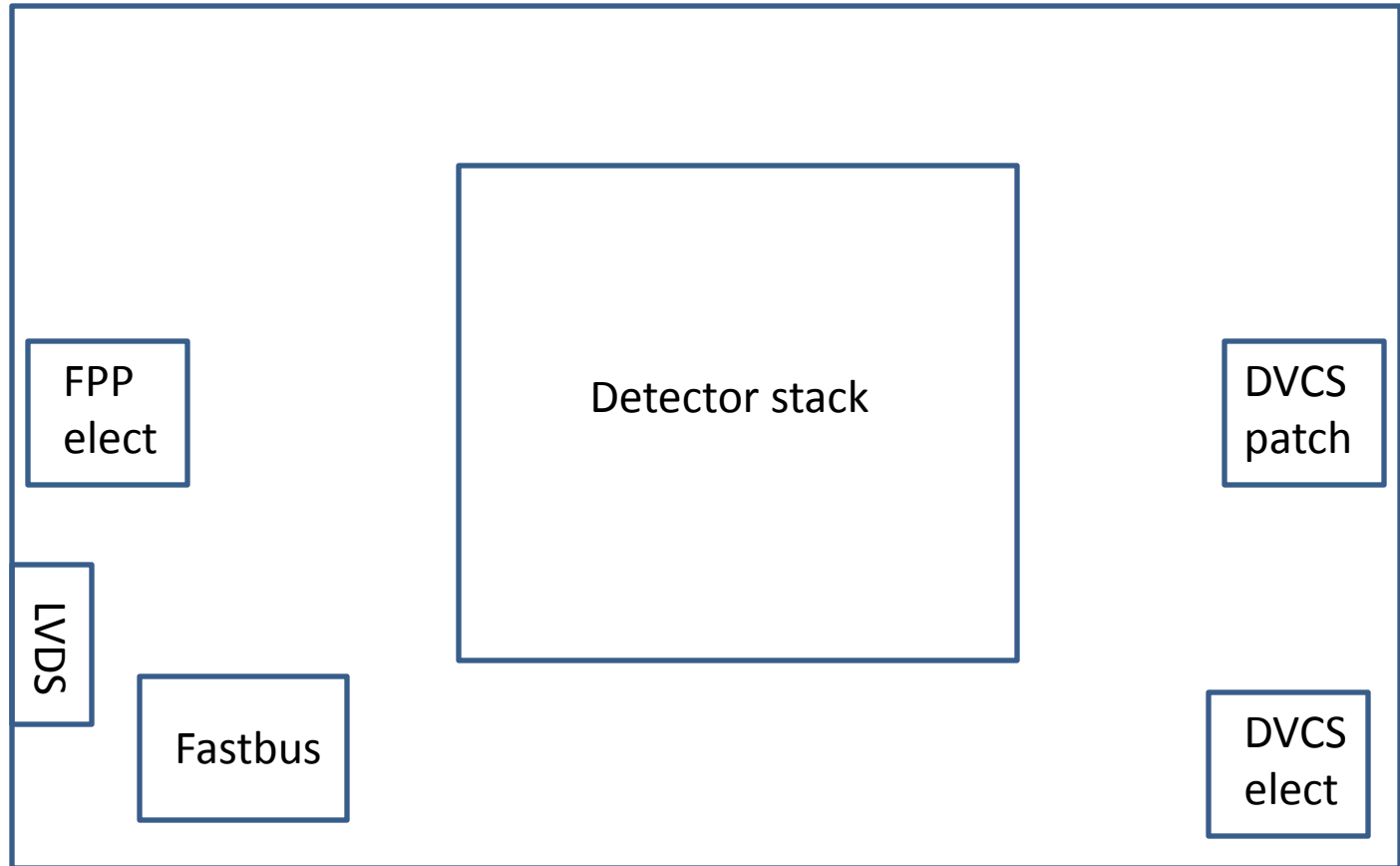
## Right arm

- S0 (2)
- 1<sup>st</sup> FPP chamber(318)
- Gas Cerenkov(10)
- S2m(32)
- Preshower(48)
- Shower(75)

## DVCS

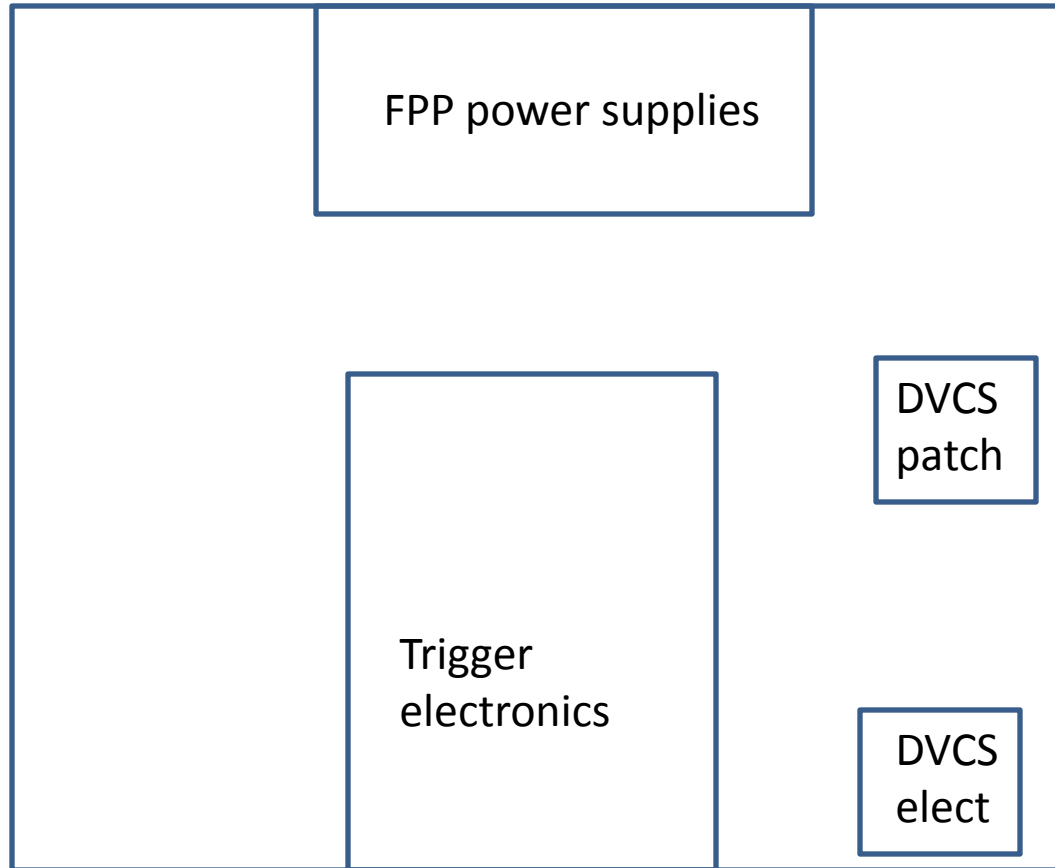
- PbF2 calorimeter ( 208 )

# Left HRS possible layout



# Left HRS possible layout ?

2<sup>nd</sup> level Left HRS platform



# Dead time measurement

- EDTM
- Radioactive source ?
- Scalers
- Clock

# Trigger

- Left and Right : single arm trigger S2m Cerenkov, S0 S2m, two out of three S0 S2m Cerenkov
- Right arm stand alone DAQ ?
- Left and Right coincidence needed ?
- Efficiency trigger : 2 out of 3 S0,S2,Cerenkov

# Scalers/normalization

- Scalers in HRS
  - Asynchronous scaler insertion
  - Synchronous every 100 events
- BCM
  - Scalers
  - ADCs ?
- Lumi
  - VtoF to scalers ( need split signal to left arm )

# DVCS electronics and trigger

- 55 meters delay : 330 ns delay
- L1 fast trigger : S2m right + Cerenkov
- L2 : coincidence with calorimeter 550 ns later
- Delay HRS signals
- Possible incompatibility : FPP electronics and DVCS electronics ( one rack space needed )



# VDC

- Switch to MAD card
- Install LVDS to ECL translator
- Cable TDCs

# Readout

- 3 Fastbus crates in both HRS
  - Switch to 1877S
  - Add 1875
  - 1881 for Shower, Preshower and Gas Cerenkov
  - MQT ?
- Upgrade to Intel CPU
- Upgrade to CODA 3 ?

# Upgrade ?

- Replace CAMAC crates by NIM for discriminators
- Replace CODA components to CODA 3
- Upgrade CPU to Intel CPU

# Task list

- Install VDC AD card
- Restore BCM x1,x3,x10
- Restore BPM
- Install S0
- Trigger and take cosmics : VDC detector checkout
- Align S2m timings

# Task list

- EDTM setup
- Lumi checkout / cabling
- DVCS RG213 cabling
- Timing calorimeter HRS
- Check out with cosmics
- Upgrade to CODA3 ?
- Upgrade to Intel CPUs

# Man power

- Alexandre Camsonne : DVCS DAQ, HRS DAQ / Trigger, Compton
- Robert Michaels : HRS DAQ / Trigger , Moller, Raster , BCM , BPM
- 1 DVCS student
- 1 MIT Postdoc / 1 Graduate student
- ?

# Rough timeline

Month	Year	Task 1	Task 2	Task 3
11	2012	Install VDC AD	Install FPP	Setup / check Lumi
12	2013	Install 1877S	Cable VDC	Cable FPP
1	2013	Install S0	Run Gas / Cosmics trigger	Cable BCM / BPM / Raster
2	2013	HRS cosmics checkout	Setup EDTM	Timing S2m
3	2013	HRS cosmics / high rate tests	Single arm trigger both HRS	Implement sparsification
4	2013	DVCS electronics install	Install RG213	(MQT installation ? )
5	2013	DVCS calorimeter install	DVCS cosmics trigger	Setup / check helicity
6	2013	HRS and DVCS calo cosmics	DVCS high rate tests	
7	2013	DVCS trigger timing		
8	2013	Install Intel CPU	HRS and DVCS calo cosmics	
9	2013	Install CODA3 TS and TI	Debug	

# Timeline

Month	Year	Task 1	Task 2	Task 3
10	2013	HRS and DVCS calo cosmics	HRS and DVCS calo cosmics	
11	2013		HRS / DVCS high rate tests	
12	2013			
1	2014			
2	2014			
3	2014	Commissioning beamline	Commissioning HRS	GMp / DVCS
4	2014	GMp / DVCS		
5	2014	GMp / DVCS		
6	2014	Can install DVCS here		
7	2014			
8	2014	GMp/DVCS		
9	2014	GMp/DVCS		
10	2014	GMp/DVCS		



# Conclusion

- GMp standard experiment + FPP
- Need careful normalization ( 2 % measurement)
- Space issue Left Arm need to be worked out to install DVCS and FPP
- Need to decide install DVCS from start or after shutdown
- Mostly standard equipment and time seems sufficient for installation, no particular incompatibilities for DVCS and GMp DAQ ( maybe manpower at commissioning time)