

01/10 - Afternoon

Run Number	Events	Run Type	HV_MCP	V_Encoder	HV_PMT	Time	Pressure	rate (from log)	Comments
1202	2k samples post trigger:70	BKG	-1850 V		-1450			channelmapping_ngun_Lsci1	MCP_20191001 global_lsci.cfg Trigger on LSci
1203	2k samples post trigger:70	BKG	-1850 V		-1450			channelmapping_ngun_Lsci1	MCP_20191001 global_lsci.cfg Trigger on MCP

Started working on DDgun signal with Lsci (5") and MCP

Only the charge signal in MCP has been read, since encoders are affected by an extremely high noise

Since no coincidences have been recorded looking at the oscilloscope, we set the geometry in a back-to-back configuration. But still no coincidence...

The charge signal has been inverted using a linear Fan-In/Fan-Out module in order to use a common falling edge trigger logic.

Moved to DAQ (only Lsci and MCP-charge channels recorded, connected to board00) and adjusted thresholds:

- run 1202 (Ddgun off): trigger on Lsci
- run 1203 (Ddgun off): trigger on MCP

An important bipolar pick-up on MCP, always in coincidence (160 ns later) with physical signals has been mitigated working on the Fan-In/Fan-Out module.

02/10 – Morning / MCP studies (I)

Run Number	Events	Run Type	HV_MCP	V_Encoder	HV_PMT	Time	Pressure	rate (from log)	Comments
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Two long bkg runs (1204, 1205) with DDgun off

Runs from 1206 to 1212 taken with DDgun on

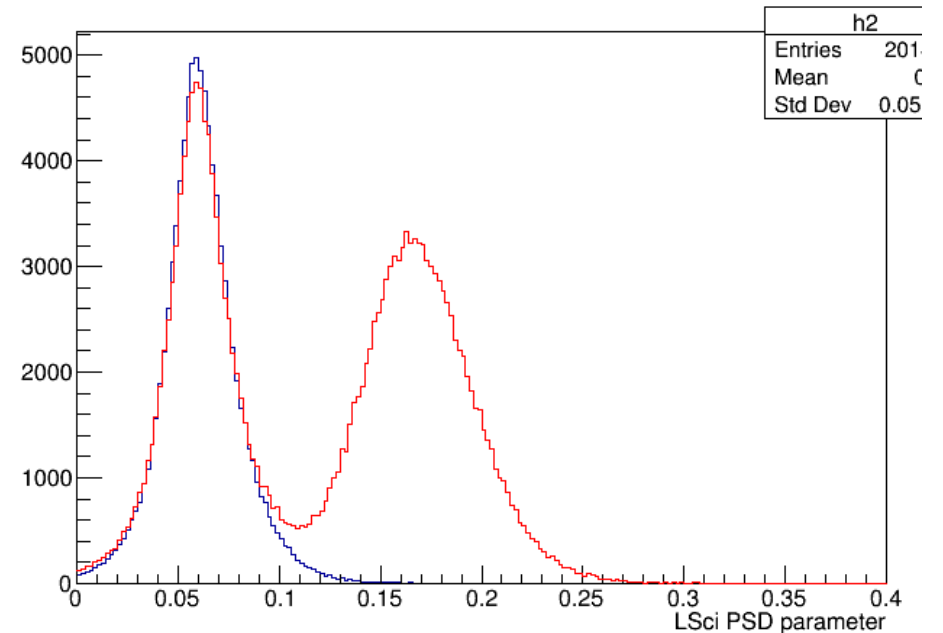
1206	2k samples post trigger:70	200k	NG	-1850 V	2.5 V	-1450	t_start: t_stop:	Trigger on LSci	channelmapping_ngun_Lsci1	MCP_20191001 global_Lsci.cfg Trigger on LSci DAQ counts: 203131 Scaler counts:207370
1207	2k samples post trigger:70	30k	NG	-1850 V	2.5 V	-1450		Trigger on MCP	channelmapping_ngun_Lsci1	MCP_20191001 global_Lsci.cfg Trigger on MCP DAQ counts: 30482 Scaler counts:30488
1208	2k samples post trigger:70	53	NG	-1850 V	2.5 V	-1450	t_start: 12.27 t_stop: 12.47	Trigger Lsci & MCP	channelmapping_ngun_Lsci1	MCP_20191001 global_Lsci.cfg Trigger on MCP && LSci DAQ counts: 53 Scaler counts:53

Lsci rate moves from ~200 Hz (gun off) to ~400 Hz (gun on)
Look at fprompt: we see neutrons!

MCP rate moves from ~1 Hz to ~60 Hz
(we definitely look something coming from Ddgun)

But, Lsci&MCP rate comparable to accidental rate
(53 counts in 20 mins)

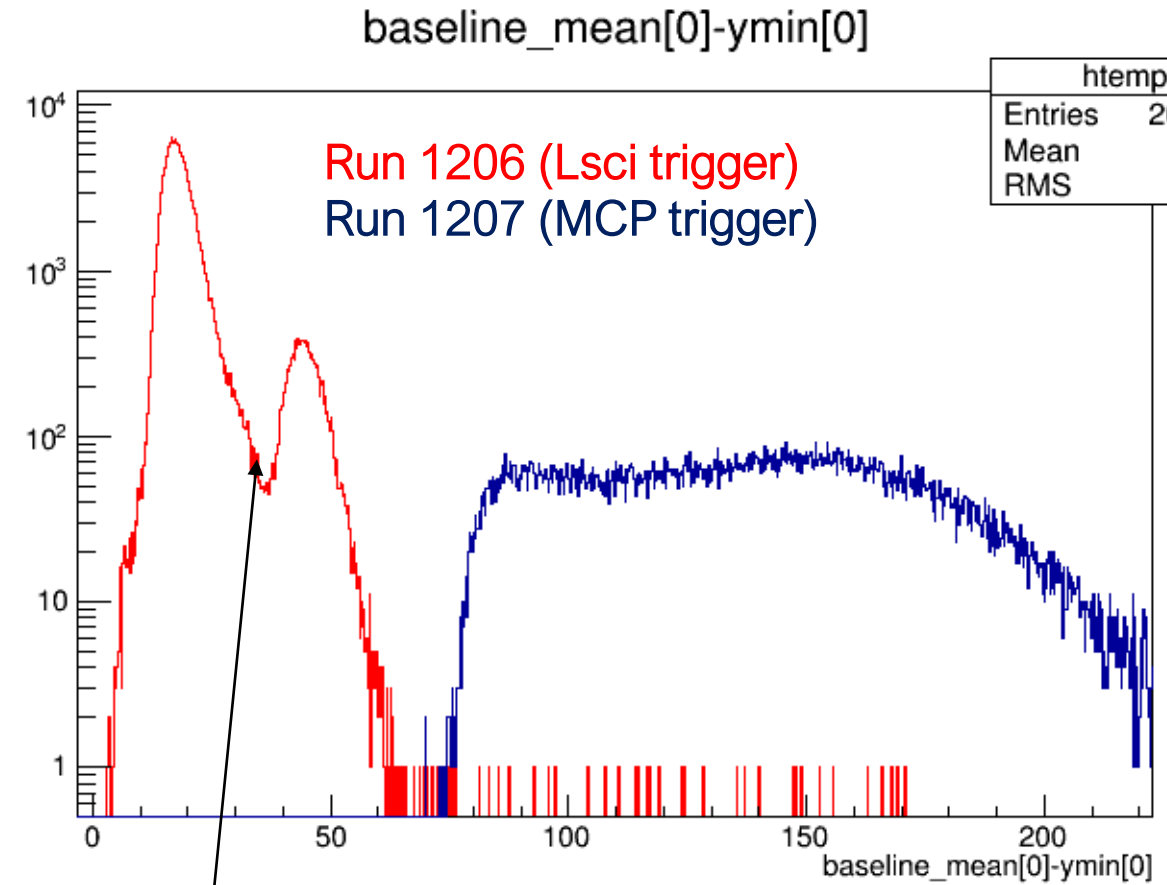
NB: we expect $2 \cdot 10^3 - 8 \cdot 10^3$ neutrons/s coming from the gun. This is comparable with the rate increase at LSci but we are missing a lot of corresponding ^3He events at MCP



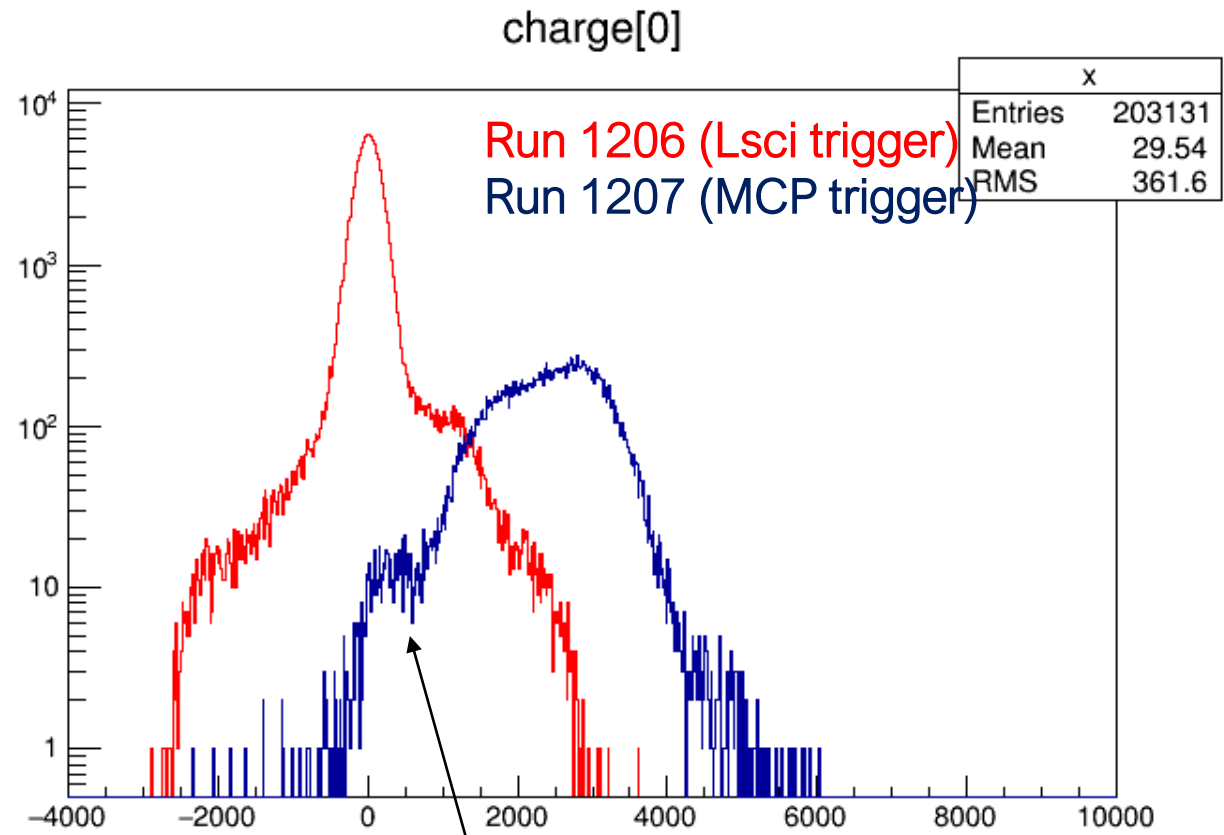
Runs from 1209 to 1215 devoted to trigger thresholds exploration in Lsci+MCP and MCP only modes

02/10 – Morning / MCP studies (I)

Amplitude (left) and charge (right) spectra of the MCP



Residual bipolar noise in MCP
(almost disappears in charge spectrum)



Triggering something out..

03/10 – Afternoon / MCP studies (II)

Moved back to Lsci+MCP gun configuration (Lsci and LCP again aligned back to back and Lsci+MCP channels connected to b00)
Trigger thresholds have been left unchanged wrt 02/10 runs

Moved to higher MCP voltage: -1850 V → -2000 V

At higher voltages a safe lock in the slow control system leads to a V trip
nevertheless working at $V > 2100$ V seems to be not so safe for the MCP in the actual voltage divider scheme

Run 1227 (trigger on Lsci only) + **Run 1228** (trigger on MCP only)

Lsci rate unchanged (as expected)

MCP rate from ~ 60 Hz \rightarrow ~ 120 Hz

No increase in coincidence mode (only dummy runs taken)

