Abraham Villatoro Tello
Autonomous University of Puebla (MX)
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Notice that for all the numbers shown here:

- The Run Number: **226062**.
- For minimum Bias I use :

CINT10-B-NOPF-ALLNOTRD || COSMB-B-NOPF-ALLNOTRD
(ADC || V0C || SPD || V0A || ADA)

Condition:	Number of Events
Total number of events:	2995914
After Minimum Bias:	1508819
ADC & ADA	883565
V0C & V0A	1020070
SPD	1348154

Run: 226062

The Numbers Obtained

		This numbers are with Trigger information only		This numbers are with the cut applied in Time info for ADs		Cut applied in Time info for ADs, and Beam-Gas rejection for V0		Cut in Time for ADs, Beam-Gas rejection for V0, PileUp rejection for SPD	
ID	Trigger combination	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB
00000	!ADC/!V0C/!SPD/!V0A/!ADA	0	0.0000	0	0.0000	0	0.0000	0	0.0000
00001	!ADC/!V0C/!SPD/!V0A/ADA	24893	0.0165	24892	0.0165	24892	0.0165	24892	0.0165
00010	!ADC/!V0C/!SPD/V0A/!ADA	10625	0.0070	10625	0.0070	10590	0.0070	10590	0.0070
00011	!ADC/!V0C/!SPD/V0A/ADA	21836	0.0145	21835	0.0145	21812	0.0145	21812	0.0145
00100	!ADC/!V0C/SPD/!V0A/!ADA	261759	0.1735	261759	0.1735	261759	0.1735	259151	0.1718
00101	!ADC/!V0C/SPD/!V0A/ADA	710	0.0005	710	0.0005	710	0.0005	697	0.0005
00110	!ADC/!V0C/SPD/V0A/!ADA	5520	0.0037	5520	0.0037	5514	0.0037	5453	0.0036
00111	!ADC/!V0C/SPD/V0A/ADA	15992	0.0106	15992	0.0106	15991	0.0106	15871	0.0105
01000	!ADC/V0C/!SPD/!V0A/!ADA	5688	0.0038	5688	0.0038	5346	0.0035	5346	0.0035
01001	!ADC/V0C/!SPD/!V0A/ADA	588	0.0004	588	0.0004	582	0.0004	582	0.0004
01010	!ADC/V0C/!SPD/V0A/!ADA	588	0.0004	588	0.0004	463	0.0003	463	0.0003
01011	!ADC/V0C/!SPD/V0A/ADA	1473	0.0010	1473	0.0010	1427	0.0009	1427	0.0009
01100	!ADC/V0C/SPD/!V0A/!ADA	5166	0.0034	5166	0.0034	5114	0.0034	4913	0.0033
01101	!ADC/V0C/SPD/!V0A/ADA	1154	0.0008	1154	0.0008	1148	0.0008	1148	0.0008
01110	!ADC/V0C/SPD/V0A/!ADA	11161	0.0074	11161	0.0074	9883	0.0066	9880	0.0065
01111	!ADC/V0C/SPD/V0A/ADA	48237	0.0320	48235	0.0320	46580	0.0309	46565	0.0309

Run: 226062

The Numbers Obtained

		This numbers are with Trigger information only		This numbers are with the cut applied in Time info for ADs		Cut applied in Time info for ADs, and Beam-Gas rejection for V0		Cut in Time for ADs, Beam-Gas rejection for V0, PileUp rejection for SPD	
ID	Trigger combination	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB	# of Events	Ratio wrt MB
10000	ADC/!V0C/!SPD/!V0A/!ADA	45144	0.0299	45014	0.0298	45014	0.0298	45014	0.0298
10001	ADC/!V0C/!SPD/!V0A/ADA	5611	0.0037	5592	0.0037	5592	0.0037	5592	0.0037
10010	ADC/!V0C/!SPD/V0A/!ADA	2449	0.0016	2429	0.0016	2423	0.0016	2423	0.0016
10011	ADC/!V0C/!SPD/V0A/ADA	7608	0.0050	7559	0.0050	7551	0.0050	7551	0.0050
10100	ADC/!V0C/SPD/!V0A/!ADA	1494	0.0010	1487	0.0010	1487	0.0010	1290	0.0009
10101	ADC/!V0C/SPD/!V0A/ADA	491	0.0003	489	0.0003	489	0.0003	489	0.0003
10110	ADC/!V0C/SPD/V0A/!ADA	3302	0.0022	3261	0.0022	3261	0.0022	3261	0.0022
10111	ADC/!V0C/SPD/V0A/ADA	12751	0.0085	12595	0.0083	12593	0.0083	12592	0.0083
11000	ADC/V0C/!SPD/!V0A/!ADA	18441	0.0122	18419	0.0122	18396	0.0122	18396	0.0122
11001	ADC/V0C/!SPD/!V0A/ADA	3609	0.0024	3605	0.0024	3602	0.0024	3602	0.0024
11010	ADC/V0C/!SPD/V0A/!ADA	2848	0.0019	2834	0.0019	2820	0.0019	2820	0.0019
11011	ADC/V0C/!SPD/V0A/ADA	9264	0.0061	9218	0.0061	9188	0.0061	9188	0.0061
11100	ADC/V0C/SPD/!V0A/!ADA	24265	0.0161	24250	0.0161	24238	0.0161	23757	0.0157
11101	ADC/V0C/SPD/!V0A/ADA	9653	0.0064	9649	0.0064	9643	0.0064	9630	0.0064
11110	ADC/V0C/SPD/V0A/!ADA	111921	0.0742	111794	0.0741	111437	0.0739	111292	0.0738
11111	ADC/V0C/SPD/V0A/ADA	834578	0.5531	833645	0.5525	833379	0.5523	831407	0.5510
	Total:	**1508819**	**1.0000**	**1507226**	**0.9989**	**1502924**	**0.9961**	**1497094**	**0.9922**

Number of –C, -A, -E triggered events for each combination.

First I changed the trigger mask for –A, -C, -E in the minimum Bias:

CINT10-B-NOPF-ALLNOTRD || COSMB-B-NOPF-ALLNOTRD

to

CINT10-A-NOPF-ALLNOTRD || COSMB-A-NOPF-ALLNOTRD

And count the number of triggered events for each of the 32 combinations defined.
In order to be able to substract the noise.

Total contribution(counts) = **B – A*fA – C*fC – E*fE**

Where:

- B -> Events from Beam-Beam interaction.
- A -> Events from Beam-Empty.
- C -> Events from Empty-Beam.
- E -> Events from Empty-Empty.
- fA, fC -> Scaling factors to the intensity of (A, C)
- fE -> Number of Bunches “E” we have in B acording to the filling scheme.

Number of –C, -A, -E triggered events for each combination.

		Numer of Events for MBor (-A) "CINT10-A || COSMB-A"		Numer of Events for MBor (-C) "CINT10-C || COSMB-C"		Number of Events for MBor (-E) "CINT10-E || COSMB-E"	
ID	Trigger combination	# of Events	Correction Factor	# of Events	Correction Factor	# of Events	Correction Factor
00000	!ADC/!V0C/!SPD/!V0A/!ADA	4	0.651	0	0.614	0	7.5
00001	!ADC/!V0C/!SPD/!V0A/ADA	0	0.651	0	0.614	0	7.5
00010	!ADC/!V0C/!SPD/V0A/!ADA	2	0.651	0	0.614	0	7.5
00011	!ADC/!V0C/!SPD/V0A/ADA	22	0.651	0	0.614	0	7.5
00100	!ADC/!V0C/SPD/!V0A/!ADA	28	0.651	3	0.614	0	7.5
00101	!ADC/!V0C/SPD/!V0A/ADA	4	0.651	0	0.614	0	7.5
00110	!ADC/!V0C/SPD/V0A/!ADA	10	0.651	0	0.614	0	7.5
00111	!ADC/!V0C/SPD/V0A/ADA	92	0.651	0	0.614	0	7.5
01000	!ADC/V0C/!SPD/!V0A/!ADA	0	0.651	0	0.614	0	7.5
01001	!ADC/V0C/!SPD/!V0A/ADA	0	0.651	0	0.614	0	7.5
01010	!ADC/V0C/!SPD/V0A/!ADA	0	0.651	0	0.614	0	7.5
01011	!ADC/V0C/!SPD/V0A/ADA	1	0.651	0	0.614	0	7.5
01100	!ADC/V0C/SPD/!V0A/!ADA	1	0.651	0	0.614	0	7.5
01101	!ADC/V0C/SPD/!V0A/ADA	0	0.651	0	0.614	0	7.5
01110	!ADC/V0C/SPD/V0A/!ADA	0	0.651	0	0.614	0	7.5
01111	!ADC/V0C/SPD/V0A/ADA	47	0.651	0	0.614	0	7.5
10000	ADC/!V0C/!SPD/!V0A/!ADA	0	0.651	0	0.614	0	7.5
10001	ADC/!V0C/!SPD/!V0A/ADA	0	0.651	0	0.614	0	7.5
10010	ADC/!V0C/!SPD/V0A/!ADA	0	0.651	0	0.614	0	7.5
10011	ADC/!V0C/!SPD/V0A/ADA	7	0.651	0	0.614	0	7.5
10100	ADC/!V0C/SPD/!V0A/!ADA	0	0.651	6	0.614	0	7.5
10101	ADC/!V0C/SPD/!V0A/ADA	2	0.651	1	0.614	0	7.5
10110	ADC/!V0C/SPD/V0A/!ADA	2	0.651	0	0.614	0	7.5
10111	ADC/!V0C/SPD/V0A/ADA	150	0.651	7	0.614	2	7.5
11000	ADC/V0C/!SPD/!V0A/!ADA	0	0.651	34	0.614	0	7.5
11001	ADC/V0C/!SPD/!V0A/ADA	0	0.651	38	0.614	0	7.5
11010	ADC/V0C/!SPD/V0A/!ADA	0	0.651	0	0.614	0	7.5
11011	ADC/V0C/!SPD/V0A/ADA	0	0.651	0	0.614	0	7.5
11100	ADC/V0C/SPD/!V0A/!ADA	0	0.651	47	0.614	0	7.5
11101	ADC/V0C/SPD/!V0A/ADA	40	0.651	211	0.614	7	7.5
11110	ADC/V0C/SPD/V0A/!ADA	0	0.651	35	0.614	0	7.5
11111	ADC/V0C/SPD/V0A/ADA	14	0.651	45	0.614	0	7.5
	Total:	426		427		9	

	SOR	EOR	Avg
Interacting Bunches Beam 1	1.16E+11	1.16E+11	1.16E+11
Non Interacting Bunches Beam 1	1.78E+11	1.78E+11	1.78E+11
Interacting Bunches Beam 2	1.21E+11	1.20E+11	1.20E+11
Non Interacting Bunches Beam 2	1.97E+11	1.97E+11	1.97E+11

- The "**Beam 1**" is the clockwise LHC Beam (For us, Beam from A-side)
- The "**Beam 2**" is anticlockwise LHC Beam (For us, Beam from C-side)

The correction factors can be calculated dividing the number of *Interacting Bunches* by the number of *Non Interacting Bunches*.

As for the Empty-Empty events we can take a look at the "Trigger Info" Tab in ALICE-logbook and find the number of E events in the filling scheme.

https://alice-logbook.cern.ch/logbook/date_online.php?p_cont=rund&p_run=226062&p_tab=trg&p_subtab=ttconf

		Number of Events after correction factors	
ID	Trigger combination	# of Events	Ratio wrt MB
00000	!ADC/!V0C/!SPD/!V0A/!ADA	0	0.00000
00001	!ADC/!V0C/!SPD/!V0A/ADA	24892	0.01650
00010	!ADC/!V0C/!SPD/V0A/!ADA	10588.698	0.00702
00011	!ADC/!V0C/!SPD/V0A/ADA	21797.678	0.01445
00100	!ADC/!V0C/SPD/!V0A/!ADA	259130.93	0.17174
00101	!ADC/!V0C/SPD/!V0A/ADA	694.396	0.00046
00110	!ADC/!V0C/SPD/V0A/!ADA	5446.49	0.00361
00111	!ADC/!V0C/SPD/V0A/ADA	15811.108	0.01048
01000	!ADC/V0C/!SPD/!V0A/!ADA	5346	0.00354
01001	!ADC/V0C/!SPD/!V0A/ADA	582	0.00039
01010	!ADC/V0C/!SPD/V0A/!ADA	463	0.00031
01011	!ADC/V0C/!SPD/V0A/ADA	1426.349	0.00095
01100	!ADC/V0C/SPD/!V0A/!ADA	4912.349	0.00326
01101	!ADC/V0C/SPD/!V0A/ADA	1148	0.00076
01110	!ADC/V0C/SPD/V0A/!ADA	9880	0.00655
01111	!ADC/V0C/SPD/V0A/ADA	46534.403	0.03084
10000	ADC/!V0C/!SPD/!V0A/!ADA	45014	0.02983
10001	ADC/!V0C/!SPD/!V0A/ADA	5592	0.00371
10010	ADC/!V0C/!SPD/V0A/!ADA	2423	0.00161
10011	ADC/!V0C/!SPD/V0A/ADA	7546.443	0.00500
10100	ADC/!V0C/SPD/!V0A/!ADA	1286.316	0.00085
10101	ADC/!V0C/SPD/!V0A/ADA	487.084	0.00032
10110	ADC/!V0C/SPD/V0A/!ADA	3259.698	0.00216
10111	ADC/!V0C/SPD/V0A/ADA	12505.052	0.00829
11000	ADC/V0C/!SPD/!V0A/!ADA	18375.124	0.01218
11001	ADC/V0C/!SPD/!V0A/ADA	3578.668	0.00237
11010	ADC/V0C/!SPD/V0A/!ADA	2820	0.00187
11011	ADC/V0C/!SPD/V0A/ADA	9188	0.00609
11100	ADC/V0C/SPD/!V0A/!ADA	23728.142	0.01573
11101	ADC/V0C/SPD/!V0A/ADA	9526.906	0.00631
11110	ADC/V0C/SPD/V0A/!ADA	111270.51	0.07375
11111	ADC/V0C/SPD/V0A/ADA	831370.256	0.55101
	Total:	**1496624.6**	**0.99192**

Lets not forget…

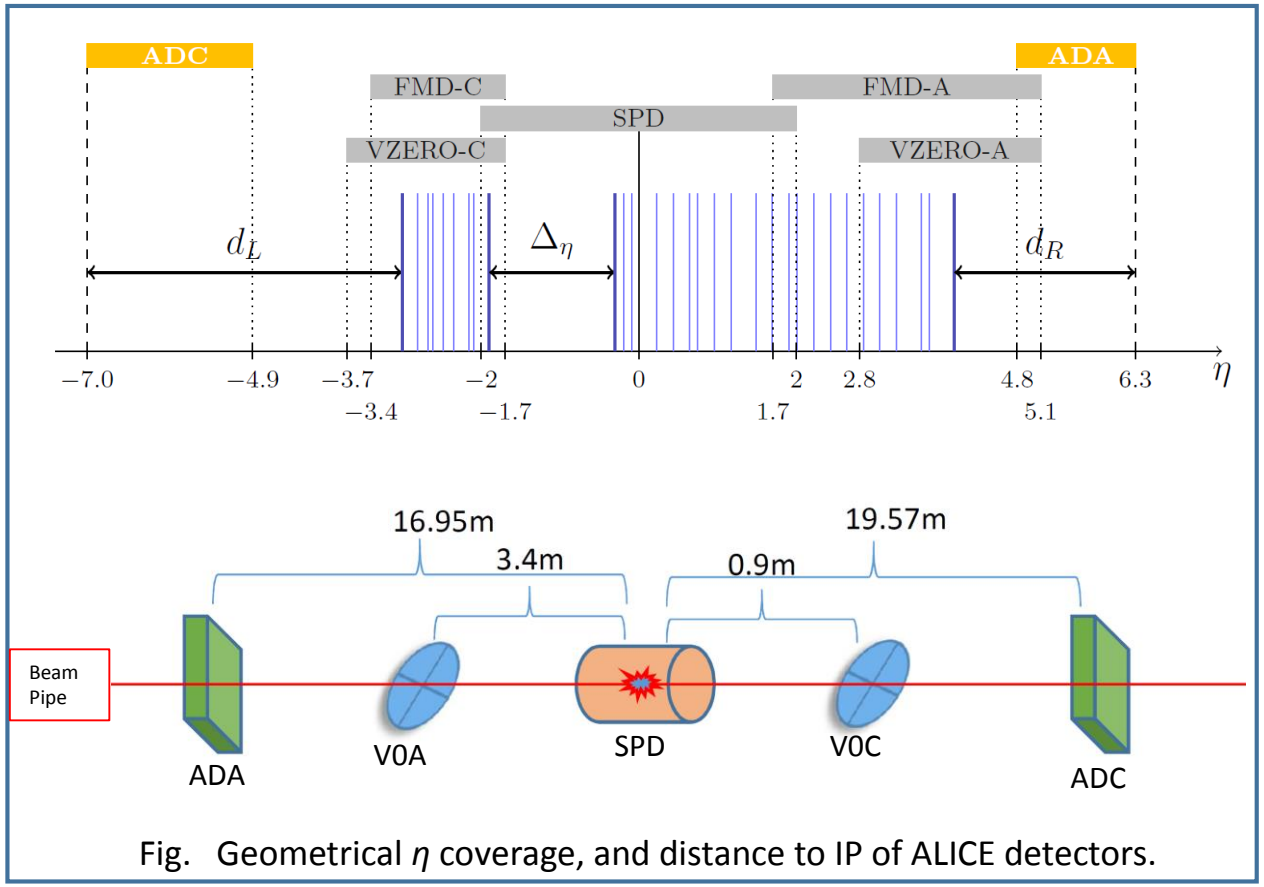

Fig. Geometrical η coverage, and distance to IP of ALICE detectors.

Classifying Events

		Number of Events after correction factors	
ID	Trigger combination	# of Events	Ratio wrt MB
00000	!ADC/!V0C/!SPD/!V0A/!ADA	0	0.00000
00001	!ADC/!V0C/!SPD/!V0A/ADA	24892	0.01650
00010	!ADC/!V0C/!SPD/V0A/!ADA	10588.698	0.00702
00011	!ADC/!V0C/!SPD/V0A/ADA	21797.678	0.01445
00100	!ADC/!V0C/SPD/!V0A/!ADA	259130.93	0.17174
00101	!ADC/!V0C/SPD/!V0A/ADA	694.396	0.00046
00110	!ADC/!V0C/SPD/V0A/!ADA	5446.49	0.00361
00111	!ADC/!V0C/SPD/V0A/ADA	15811.108	0.01048
01000	!ADC/V0C/!SPD/!V0A/!ADA	5346	0.00354
01001	!ADC/V0C/!SPD/!V0A/ADA	582	0.00039
01010	!ADC/V0C/!SPD/V0A/!ADA	463	0.00031
01011	!ADC/V0C/!SPD/V0A/ADA	1426.349	0.00095
01100	!ADC/V0C/SPD/!V0A/!ADA	4912.349	0.00326
01101	!ADC/V0C/SPD/!V0A/ADA	1148	0.00076
01110	!ADC/V0C/SPD/V0A/!ADA	9880	0.00655
01111	!ADC/V0C/SPD/V0A/ADA	46534.403	0.03084
10000	ADC/!V0C/!SPD/!V0A/!ADA	45014	0.02983
10001	ADC/!V0C/!SPD/!V0A/ADA	5592	0.00371
10010	ADC/!V0C/!SPD/V0A/!ADA	2423	0.00161
10011	ADC/!V0C/!SPD/V0A/ADA	7546.443	0.00500
10100	ADC/!V0C/SPD/!V0A/!ADA	1286.316	0.00085
10101	ADC/!V0C/SPD/!V0A/ADA	487.084	0.00032
10110	ADC/!V0C/SPD/V0A/!ADA	3259.698	0.00216
10111	ADC/!V0C/SPD/V0A/ADA	12505.052	0.00829
11000	ADC/V0C/!SPD/!V0A/!ADA	18375.124	0.01218
11001	ADC/V0C/!SPD/!V0A/ADA	3578.668	0.00237
11010	ADC/V0C/!SPD/V0A/!ADA	2820	0.00187
11011	ADC/V0C/!SPD/V0A/ADA	9188	0.00609
11100	ADC/V0C/SPD/!V0A/!ADA	23728.142	0.01573
11101	ADC/V0C/SPD/!V0A/ADA	9526.906	0.00631
11110	ADC/V0C/SPD/V0A/!ADA	111270.51	0.07375
11111	ADC/V0C/SPD/V0A/ADA	831370.256	0.55101
	Total:	1496624.6	0.99192

- We have defined 5 type of events. (SDL, SDR, DD, CD, ND)
- How to classify this combinations?
- This is as my understanding.

SDR (Taking as right A-Side)

SDL (Taking as left C-Side)

DD (Double diffractive)

CD (Central diffractive)

Background ??

ND (All the rest)

- If we use the selection as in the previous slide, then we will have…

Event Type	Number of Events	Ratio wrt Mbor
Total number of Events	2995914	-
Events after Mbor	1508819	-
ND (Non Diff)	1134344	0.75181
SDL (Single Diff left)	46300.31	0.03068
SDR (Single Diff right)	25586.39	0.01696
CD (Central Diff)	259130.93	0.17174
DD (Double Diff)	6079.08	0.00403
Background ?	25183.809	0.01669
Total	-	0.99191

Including T0 in the combinatorics

T0 -> $-3.3 < \eta < -2.9$, $4.5 < \eta < 5$

ALICE
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➢ **Notice that I include T0 in the combinatorics order as if it was further from IP than V0s. This is only true for A-Side**

		Number of Events after correction factors	
ID	Trigger combination	# of Events	Ratio wrt MB
0000000	!ADC/!T0C/!V0C/!SPD/!V0A/!T0A/!ADA	0	0.00000
0000001	!ADC/!T0C/!V0C/!SPD/!V0A/!T0A/ADA	24892	0.01650
0000010	!ADC/!T0C/!V0C/!SPD/!V0A/T0A/!ADA	0	0.00000
0000011	!ADC/!T0C/!V0C/!SPD/!V0A/T0A/ADA	0	0.00000
0000100	!ADC/!T0C/!V0C/!SPD/V0A/!T0A/!ADA	10585	0.00702
0000101	!ADC/!T0C/!V0C/!SPD/V0A/!T0A/ADA	21810	0.01446
0000110	!ADC/!T0C/!V0C/!SPD/V0A/T0A/!ADA	0	0.00000
0000111	!ADC/!T0C/!V0C/!SPD/V0A/T0A/ADA	0	0.00000
0001000	!ADC/!T0C/!V0C/SPD/!V0A/!T0A/!ADA	259133	0.17175
0001001	!ADC/!T0C/!V0C/SPD/!V0A/!T0A/ADA	697	0.00046
0001010	!ADC/!T0C/!V0C/SPD/!V0A/T0A/!ADA	0	0.00000
0001011	!ADC/!T0C/!V0C/SPD/!V0A/T0A/ADA	0	0.00000
0001100	!ADC/!T0C/!V0C/SPD/V0A/!T0A/!ADA	5446	0.00361
0001101	!ADC/!T0C/!V0C/SPD/V0A/!T0A/ADA	15840	0.01050
0001110	!ADC/!T0C/!V0C/SPD/V0A/T0A/!ADA	0	0.00000
0001111	!ADC/!T0C/!V0C/SPD/V0A/T0A/ADA	0	0.00000
0010000	!ADC/!T0C/V0C/!SPD/!V0A/!T0A/!ADA	4275	0.00283
0010001	!ADC/!T0C/V0C/!SPD/!V0A/!T0A/ADA	437	0.00029
0010010	!ADC/!T0C/V0C/!SPD/!V0A/T0A/!ADA	0	0.00000
0010011	!ADC/!T0C/V0C/!SPD/!V0A/T0A/ADA	0	0.00000
0010100	!ADC/!T0C/V0C/!SPD/V0A/!T0A/!ADA	329	0.00022
0010101	!ADC/!T0C/V0C/!SPD/V0A/!T0A/ADA	1062	0.00070
0010110	!ADC/!T0C/V0C/!SPD/V0A/T0A/!ADA	0	0.00000
0010111	!ADC/!T0C/V0C/!SPD/V0A/T0A/ADA	0	0.00000
0011000	!ADC/!T0C/V0C/SPD/!V0A/!T0A/!ADA	3526	0.00234
0011001	!ADC/!T0C/V0C/SPD/!V0A/!T0A/ADA	799	0.00053
0011010	!ADC/!T0C/V0C/SPD/!V0A/T0A/!ADA	0	0.00000
0011011	!ADC/!T0C/V0C/SPD/!V0A/T0A/ADA	0	0.00000
0011100	!ADC/!T0C/V0C/SPD/V0A/!T0A/!ADA	6351	0.00421
0011101	!ADC/!T0C/V0C/SPD/V0A/!T0A/ADA	27905	0.01849
0011110	!ADC/!T0C/V0C/SPD/V0A/T0A/!ADA	0	0.00000
0011111	!ADC/!T0C/V0C/SPD/V0A/T0A/ADA	0	0.00000

		Number of Events after correction factors	
ID	Trigger combination	# of Events	Ratio wrt MB
0100000	!ADC/T0C/!V0C/!SPD/!V0A/!T0A/!ADA	0	0.00000
0100001	!ADC/T0C/!V0C/!SPD/!V0A/!T0A/ADA	0	0.00000
0100010	!ADC/T0C/!V0C/!SPD/!V0A/T0A/!ADA	0	0.00000
0100011	!ADC/T0C/!V0C/!SPD/!V0A/T0A/ADA	0	0.00000
0100100	!ADC/T0C/!V0C/!SPD/V0A/!T0A/!ADA	0	0.00000
0100101	!ADC/T0C/!V0C/!SPD/V0A/!T0A/ADA	0	0.00000
0100110	!ADC/T0C/!V0C/!SPD/V0A/T0A/!ADA	5	0.00002
0100111	!ADC/T0C/!V0C/!SPD/V0A/T0A/ADA	2	
0101000	!ADC/T0C/!V0C/SPD/!V0A/!T0A/!ADA		
0101001	!ADC/T0C/!V0C/SPD/!V0A/!T0		0.00000
0101010	!ADC/T0C/!V0C/	18	0.00001
0101011	!ADC	0	0.00000
0101100	!ADC	0	0.00000
0101101	!ADC	0	0.00000
0101110	!ADC/T0C/!V0C/SPD/V0A/T0A/!ADA	7	0.00000
0101111	!ADC/T0C/!V0C/SPD/V0A/T0A/ADA	31	0.00002
0110000	!ADC/T0C/V0C/!SPD/!V0A/!T0A/!ADA	0	0.00000
0110001	!ADC/T0C/V0C/!SPD/!V0A/!T0A/ADA	0	0.00000
0110010	!ADC/T0C/V0C/!SPD/!V0A/T0A/!ADA	1071	0.00071
0110011	!ADC/T0C/V0C/!SPD/!V0A/T0A/ADA	145	0.00010
0110100	!ADC/T0C/V0C/!SPD/V0A/!T0A/!ADA	0	0.00000
0110101	!ADC/T0C/V0C/!SPD/V0A/!T0A/ADA	0	0.00000
0110110	!ADC/T0C/V0C/!SPD/V0A/T0A/!ADA	134	0.00009
0110111	!ADC/T0C/V0C/!SPD/V0A/T0A/ADA	365	0.00024
0111000	!ADC/T0C/V0C/SPD/!V0A/!T0A/!ADA	0	0.00000
0111001	!ADC/T0C/V0C/SPD/!V0A/!T0A/ADA	0	0.00000
0111010	!ADC/T0C/V0C/SPD/!V0A/T0A/!ADA	1387	0.00092
0111011	!ADC/T0C/V0C/SPD/!V0A/T0A/ADA	349	0.00023
0111100	!ADC/T0C/V0C/SPD/V0A/!T0A/!ADA	0	0.00000
0111101	!ADC/T0C/V0C/SPD/V0A/!T0A/ADA	0	0.00000
0111110	!ADC/T0C/V0C/SPD/V0A/T0A/!ADA	3529	0.00234
0111111	!ADC/T0C/V0C/SPD/V0A/T0A/ADA	18660	0.01237

➢ For more details look into Excel file

		Number of Events after correction factors	
ID	Trigger combination	# of Events	Ratio wrt MB
1000000	ADC/!T0C/!V0C/!SPD/!V0A/!T0A/!ADA	44968	0.02980
1000001	ADC/!T0C/!V0C/!SPD/!V0A/!T0A/ADA	5583	0.00370
1000010	ADC/!T0C/!V0C/!SPD/!V0A/T0A/!ADA	0	0.00000
1000011	ADC/!T0C/!V0C/!SPD/!V0A/T0A/ADA	0	0.00000
1000100	ADC/!T0C/!V0C/!SPD/V0A/!T0A/!ADA	2418	0.00160
1000101	ADC/!T0C/!V0C/!SPD/V0A/!T0A/ADA	7532	0.00499
1000110	ADC/!T0C/!V0C/!SPD/V0A/T0A/!ADA	0	0.00000
1000111	ADC/!T0C/!V0C/!SPD/V0A/T0A/ADA	0	0.00000
1001000	ADC/!T0C/!V0C/SPD/!V0A/!T0A/!ADA	1279	0.00085
1001001	ADC/!T0C/!V0C/SPD/!V0A/!T0A/ADA	486	0.00032
1001010	ADC/!T0C/!V0C/SPD/!V0A/T0A/!ADA	0	0.00000
1001011	ADC/!T0C/!V0C/SPD/!V0A/T0A/ADA	0	0.00000
1001100	ADC/!T0C/!V0C/SPD/V0A/!T0A/!ADA	3239	0.00215
1001101	ADC/!T0C/!V0C/SPD/V0A/!T0A/ADA	12500	0.00828
1001110	ADC/!T0C/!V0C/SPD/V0A/T0A/!ADA	0	0.00000
1001111	ADC/!T0C/!V0C/SPD/V0A/T0A/ADA	0	0.00000
1010000	ADC/!T0C/V0C/!SPD/!V0A/!T0A/!ADA	12875	0.00853
1010001	ADC/!T0C/V0C/!SPD/!V0A/!T0A/ADA	2402	0.00159
1010010	ADC/!T0C/V0C/!SPD/!V0A/T0A/!ADA	0	0.00000
1010011	ADC/!T0C/V0C/!SPD/!V0A/T0A/ADA	0	0.00000
1010100	ADC/!T0C/V0C/!SPD/V0A/!T0A/!ADA	1840	0.00122
1010101	ADC/!T0C/V0C/!SPD/V0A/!T0A/ADA	5880	0.00390
1010110	ADC/!T0C/V0C/!SPD/V0A/T0A/!ADA	0	0.00000
1010111	ADC/!T0C/V0C/!SPD/V0A/T0A/ADA	0	0.00000
1011000	ADC/!T0C/V0C/SPD/!V0A/!T0A/!ADA	12870	0.00853
1011001	ADC/!T0C/V0C/SPD/!V0A/!T0A/ADA	5018	0.00333
1011010	ADC/!T0C/V0C/SPD/!V0A/T0A/!ADA	0	0.00000
1011011	ADC/!T0C/V0C/SPD/!V0A/T0A/ADA	0	0.00000
1011100	ADC/!T0C/V0C/SPD/V0A/!T0A/!ADA	44162	0.02927
1011101	ADC/!T0C/V0C/SPD/V0A/!T0A/ADA	229462	0.15208
1011110	ADC/!T0C/V0C/SPD/V0A/T0A/!ADA	0	0.00000
1011111	ADC/!T0C/V0C/SPD/V0A/T0A/ADA	0	0.00000

Including **T0** in the combinatorics

- We can see the effect of including **T0** in the combinatorics
- Notice that these numbers are without the correction for "**-A**, **-C**, **-E**" events

ID	Trigger Combination	# of Events	Ratio wrt MBor
00100	**!ADC/!V0C/SPD/!V0A/!ADA**	259151	0.17175
00001	**!ADC/!V0C/!SPD/!V0A/ADA**	24892	0.01650
00101	**!ADC/!V0C/SPD/!V0A/ADA**	697	0.00046
10000	**ADC/!V0C/!SPD/!V0A/!ADA**	45014	0.02983
10100	**ADC/!V0C/SPD/!V0A/!ADA**	1290	0.00085
10101	**ADC/!V0C/SPD/!V0A/ADA**	489	0.00032

ID	Trigger Combination	# of Events	Ratio wrt MBor
0001000	**!ADC/!T0C/!V0C/SPD/!V0A/!T0A/!ADA**	259133	0.17175
0000001	**!ADC/!T0C/!V0C/!SPD/!V0A/!T0A/ADA**	24892	0.01650
0001001	**!ADC/!T0C/!V0C/SPD/!V0A/!T0A/ADA**	697	0.00046
1000000	**ADC/!T0C/!V0C/!SPD/!V0A/!T0A/!ADA**	44968	0.02980
1001000	**ADC/!T0C/!V0C/SPD/!V0A/!T0A/!ADA**	1279	0.00085
1001001	**ADC/!T0C/!V0C/SPD/!V0A/!T0A/ADA**	486	0.00032

To do:

- Write down all that has been done to obtain these numbers (Data samples, inputs in fwd detectors: trigger classes, signal and trigger generation (charge & time), beam related backgrounds, trigger combinations (SPD/V0/AD) & correlations with T0). **-> Ongoing**

writing part of analysis note

After LS1 of LHC, a new sub-detector dedicated to the study of diffractive events was incorporated to ALICE experiment, AD detector. I was installed in both sides of the interaction point in a roughly symmetric way. It covers the regions in pseudo-rapidity from -7.0<η<-4.9 (ADC) and 4.8< η <6.3 (ADA), placed at 19.57m and 16.95m from IP respectively.

By combining this new detector with the already existent detectors V0 (-3.7< η<-1.7 for V0C and 2.8< η<5.1 for V0A), SPD (-2< η<2) and T0 (-3.3< η<-2.9 for T0C and 4.5< η<5 for T0A) we can obtain a measurement of the cross section for the double diffractive events in the forward region. The study carried out is based on the fact that diffractive reactions can be defined in terms of gaps in pseudo-rapidity. To find these gaps we rely on the acceptance of the mentioned detectors.

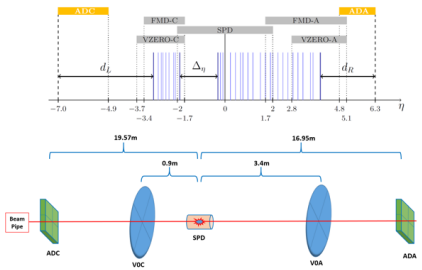


Fig: Up: Geometrical η coverage. Down: Distance to interaction point in ALICE of AD, V0 and SPD detectors

Due to the new incorporation of AD detector during LHC Run2, it was necessary to understand its operation, just like it was needed to look at its efficiency for trigger generation.

In AD the algorithm for trigger generation is based on the time measurement of the signals generated by the detector, for such reason we focus mainly on trying to clean the sample of the time signals for the 16 channels of the detector.

One of the things we could observe is that AD is sensitive to the satellites generated within the LHC, besides we could see an asymmetric behaviour between both sides of the detector (at different sides of IP).

To clean up the trigger sample of AD, we defined a time window, in such a way that the events inside that window will be taken as "real hits", and the events outside were considered as Beam-Gas events.

For AD C-Side the defined windows was 7.5ns width (61.5ns<time<69ns). We looked at different trigger conditions, and different channels, and this window proved to be consistent.

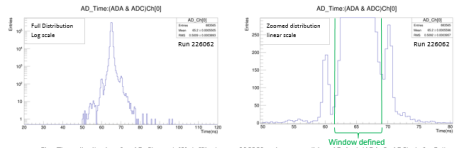


Fig: Time distribution for AD Channel [0] (offline), run 226062, trigger condition AD-And (ADA & ADC). Left: Full distribution, Right: Zoom in linear scale to the same distribution with the time window defined in green.

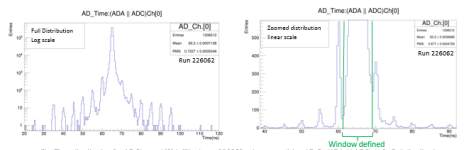


Fig: Time distribution for AD Channel [0] (offline), run 226062, trigger condition AD-Or (ADA || ADC). Left: Full distribution, satellites are visible. Right: Zoom in linear scale to the same distribution with the time window defined in green.

As for AD A-Side, it was observed that the time distributions are contaminated with some "early hits", this is due to the fact that the PMTs in this side are close to the beam pipe (AD beam-test proved this effect). So for this case, is not trivial to define a time window that can cut away these so called early hits. Even so, a time window was defined in such a way that we can eliminate Beam-Gas events as well as the satellites also visible in this side. The time window is 40ns width (40ns<time<80ns).

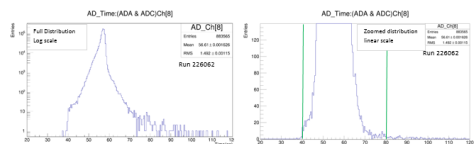


Fig: Time distribution for AD Channel [8] (offline), run 226062, trigger condition AD-And (ADA & ADC). Left: Full distribution. Right: Zoom in linear scale to the same distribution with the time window defined in green.

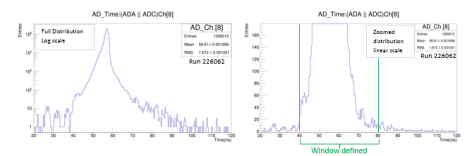


Fig: Time distribution for AD Channel [8] (offline), run 226062, trigger condition AD-Or (ADA || ADC). Left: Full distribution. Right: Zoom in linear scale to the same distribution with the time window defined in green.

As we can see, this window is also consistent for different trigger conditions, and it could be improved, but due to the negligible effect of this events in the final selection, we leave it like that.

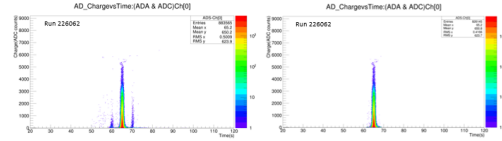


Fig: Charge vs Time distribution for AD Channel [0] (offline), run 226062, trigger condition AD-And (ADA & ADC). Left: Full distribution before the cut. Right: Some distribution after the cut applied.

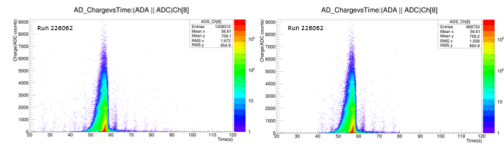


Fig: Charge vs Time distribution for AD Channel [8] (offline), run 226062, trigger condition AD-Or (ADA || ADC). Left: Full distribution before the cut. Right: Some distribution after the cut applied.

In the case of V0 detector, the sample was cleaned applying Beam-Gas rejection, based on the "V0-Decision", and also in the trigger generated by the same detector.

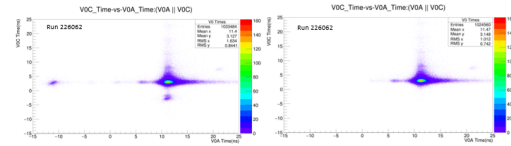


Fig: V0-C-Side vs V0-A-Side, run 226062, trigger condition V0-Or (V0C || V0A). Left: Full distribution before applying V0-Decision. Right: Same distribution after V0-Decision is applied.

Now for the events generated by SPD, we use a method already established for the selection of events. We take into account the number of "fired" clusters and the number of tracklets obtain. As a first step we remove the pile-up events and then with a 2-D graph of clusters vs tracklets, we can apply a linear cut with slope 4 and offset 35.

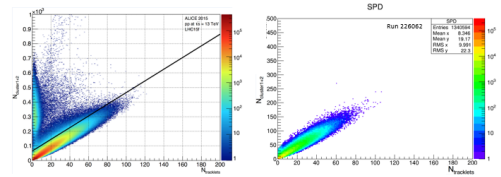


Fig: SPD Number of Clusters vs Number of Tracklets. Left: Full distribution for LHC15f-period. Right: SPD Number of Clusters vs Number of Tracklets for run 226062 after applying the cut.

Once the selection of events is defined by detector, we obtained the 32 mutually exclusive combinations occupying both, the trigger masks and the cuts mentioned here.

TRIGGER MASK	TRIGGERED DETECTOR
C0UBC-B	ADC
C0UBA-B	ADA
C0VBC-B	V0C
C0VBA-B	V0A
C0SMB-B	SPD
C0TOC-B	T0C
C0TOA-B	T0A
C0SMB-B-NOPF-ALLNOTRD	SPD
CINT10-B-NOPF-ALLNOTRD	ADC||ADA||V0C||V0A

CODE	MEANING
-B	Event from Beam-Beam
-A	Event from Beam-Empty
-C	Event from Empty-Beam
-E	Event from Empty-Empty
-NOPF	No past-future protection
-ALLNOTRD	ADO, ACO, CPV, EMC, FMD, HMP, MCH, MTR, PHO, PMD, SDD, SPD, SSD, T00, TOF, TPC, V00, ZDC

Table 1: Trigger masks used for the selection of events. And meaning of the codes.

The intention for all of this is in order to be able to define the pseudo-rapidity gaps and in the same time estimate the number of diffractive events.

For this study we select a "golden run" during wich most of the sub-detectors in ALICE participate. The run selected was 226062. For minimum Bias we used global MBor (COSMB-B-NOPF-ALLNOTRD || CINT10-B-NOPF-ALLNOTRD), and in order to count the number of events, we used the defined with together with the corresponding trigger mask.

ID	Trigger combination	# of Events	Ratio wrt MB
00000	!ADC/!V0C/!SPD/!V0A/!ADA	0	0.00000
00001	!ADC/!V0C/!SPD/!V0A/ADA	24892	0.01650
00010	!ADC/!V0C/!SPD/V0A/!ADA	10590	0.00702
00011	!ADC/!V0C/!SPD/V0A/ADA	21812	0.01446
00100	!ADC/!V0C/SPD/!V0A/!ADA	259151	0.17176
00101	!ADC/!V0C/SPD/!V0A/ADA	697	0.00046
00110	!ADC/!V0C/SPD/V0A/!ADA	5453	0.00361
00111	!ADC/!V0C/SPD/V0A/ADA	15871	0.01052
01000	!ADC/V0C/!SPD/!V0A/!ADA	5346	0.00354
01001	!ADC/V0C/!SPD/!V0A/ADA	582	0.00039
01010	!ADC/V0C/!SPD/V0A/!ADA	463	0.00031
01011	!ADC/V0C/!SPD/V0A/ADA	1427	0.00095
01100	!ADC/V0C/SPD/!V0A/!ADA	4913	0.00326
01101	!ADC/V0C/SPD/!V0A/ADA	1148	0.00076
01110	!ADC/V0C/SPD/V0A/!ADA	9880	0.00655
01111	!ADC/V0C/SPD/V0A/ADA	46565	0.03086

Table 2: First 16 combinations, number of events for combination and ratio with respect to minimum Bias.

ID	Trigger combination	# of Events	Ratio wrt MB
10000	ADC/!V0C/!SPD/!V0A/!ADA	45014	0.02983
10001	ADC/!V0C/!SPD/!V0A/ADA	5592	0.00371
10010	ADC/!V0C/!SPD/V0A/!ADA	2423	0.00161
10011	ADC/!V0C/!SPD/V0A/ADA	7551	0.00500
10100	ADC/!V0C/SPD/!V0A/!ADA	1290	0.00085
10101	ADC/!V0C/SPD/!V0A/ADA	489	0.00032
10110	ADC/!V0C/SPD/V0A/!ADA	3261	0.00216
10111	ADC/!V0C/SPD/V0A/ADA	12592	0.00835
11000	ADC/V0C/!SPD/!V0A/!ADA	18396	0.01219
11001	ADC/V0C/!SPD/!V0A/ADA	3602	0.00239
11010	ADC/V0C/!SPD/V0A/!ADA	2820	0.00187
11011	ADC/V0C/!SPD/V0A/ADA	9188	0.00609
11100	ADC/V0C/SPD/!V0A/!ADA	23757	0.01575
11101	ADC/V0C/SPD/!V0A/ADA	9630	0.00638
11110	ADC/V0C/SPD/V0A/!ADA	111292	0.07376
11111	ADC/V0C/SPD/V0A/ADA	831407	0.55103
	Total:	**1497094**	**0.9922**

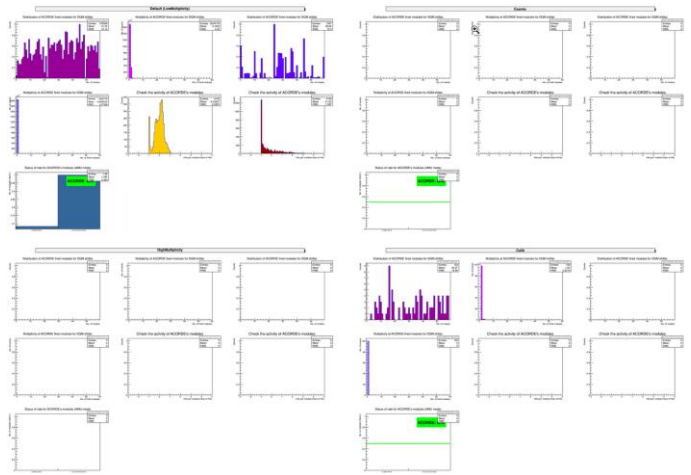
Table 3: Next 16 combinations, number of events for combination and ratio with respect to minimum Bias.

PROTON PHYSICS: STABLE BEAMS

DAQ Start Time: [21/04/2016 00:00:00..]
Beam: Yes
Duration: [10 m..]
# of Detectors: [2..]

Statistics | Detectors | Trigger Clusters | Trigger Classes | HLT | Quality Flags | Shuttle | Pause and Reset | Beam Conditions | EOR Reasons | Overview

Beam	Run	DAQ Start Time	Duration	# of Detectors	Partition	Total Data Readout (MB)	Data Rate Readout (MB/s)	Run Type	Data Migrated	L3 Magnet Current (kA)	Period	DAQ End Time	Total Events
	252271	23/04/2016 09:26:11	1.5 h	14	PHYSICS_1	9 462 607	1 734.67	PHYSICS	Yes	-30	LHC16d	23/04/2016 10:57:06	3 250 172
	252266	23/04/2016 08:28:33	53.7 m	14	PHYSICS_1	6 732 264	2 069.56	PHYSICS	Yes	-30	LHC16d	23/04/2016 09:22:46	2 220 546
	252248	23/04/2016 02:52:23	1.7 h	14	PHYSICS_1	10 455 573	1 668.09	PHYSICS	Yes	-30	LHC16d	23/04/2016 04:36:51	3 587 940
	252246	23/04/2016 02:30:21	10.9 m	14	PHYSICS_1	1 150 516	1 684.50	PHYSICS	Yes	-30	LHC16d	23/04/2016 02:41:44	395 717
	252243	23/04/2016 02:01:56	15.3 m	14	PHYSICS_1	1 490 281	1 575.35	PHYSICS	Yes	-30	LHC16d	23/04/2016 02:17:42	513 599
	252238	23/04/2016 01:26:31	11.2 m	14	PHYSICS_1	1 154 681	1 640.17	PHYSICS	Yes	-30	LHC16d	23/04/2016 01:38:15	396 822
	252235	23/04/2016 01:00:31	15.4 m	14	PHYSICS_1	1 594 024	1 676.16	PHYSICS	Yes	-30	LHC16d	23/04/2016 01:16:22	551 133



DQM AD failed !

To be continued.....