PHENIX Data sets 2009-2016 (Run 9-16)

The Table below summarizes general information about data sets collected by PHENIX in Runs 9-16.

Run	Species	$\sqrt{s_{NN}}$, GeV	L_{sample} (|z|<30cm)	BBC_{30cm}/BBC_{narrow} logged	Pol	Comments
9	*p+p*	500	11 /pb		Long. 39%	
	p+p	200	16 /pb		Long. 55%	
10	*Au+Au*	200	1.5 /nb	5.7 B / –	–	Di-lepton with HBD
	Au+Au	62.4	0.11 /nb	0.7 B / –	–	
	Au+Au	39	40 /μb	0.25 B / –	–	
	Au+Au	7.7	0.3 /μb	1.7 M / –	–	
11	*p+p*	500	18 /pb		Long. 48%	HBD, TEC, RXNP removed
	Au+Au	19.6	2 /μb	13 M / –	–	VTX is in
	Au+Au	200	1.7 /nb	2.1 B / 5.2 B	–	
	Au+Au	27	7 /μb	45 M / –	–	
12	*p+p*	200	10 /pb		Trans. 56%	FVTX is in
	p+p	510	32 /pb		Long. 56%	RPC and MuTrig
	U+U	193	0.2 /nb	1.2 B / 0.8 B	–	New MPC electronics and trigger
	Cu+Au	200	5 /nb	0.8 B / 8.1 B	–	
	Au+Au	5		Very short, a lot of background	–	
13	*p+p*	510	155 /pb		Long. 56%	Main W and ΔG run
14	*Au+Au*	15	4 /μb	23 M / 10 M	–	
	Au+Au	200	7.5 /nb	3.5 B / 19 B	–	
	^{3}*He+Au*	200	24 /nb		–	
15	*p+p*	200	60 /pb		Trans. 58%	High mult. Trigger with FVTX
	p+Au	200	0.2 /pb		Trans. 61%	
	p+Al	200	0.5 /pb		Trans. 58%	Central collision trigger with BBC (A-side) in pA
16	*Au+Au*	200	7.0 /nb	0.8 B / 15 B	–	HF measurements
	d+Au	200	50 /nb		–	MPC-EX
	d+Au	62	5 /nb		–	

	d+Au	19	0.08 /nb		–	
	d+Au	39	2 /nb		–	

Numbers for integrated luminosity and of recorded events in the table relate to all "Physics" runs, as in run DB, without any QA selection.

$L_{sample}(|z|<30cm)$ is integrated luminosity calculated from the number of **live** BBCLL1 (minimum bias) triggers with nominal vertex cut of |z|<30cm. This number reflects the sampled luminosity by PHENIX within the vertex cut. In p+p and p+A collisions BBCLL1 trigger is heavily scaled down, so that physics analysis is mainly based on more exclusive triggers, e.g. high pT photon triggers (ERT), muon triggers (MUIDLL1), etc., discussed below. Data analyses from heavy ion collisions are mainly based on BBCLL1 triggers (with nominal vertex cut of |z|<30cm) or BBCLL1_narrowvtx triggers (with nominal vertex cut of |z| varying from 15 cm to 10 cm depending on year), so the number of collected events ("M" stands for million, and "B" stands for billion) with these triggers are shown in the table for heavy ion collisions only, as BBC_{30cm} and BBC_{narrow}, which are obtained from **scaled** triggers.

Beam polarization values are approximate and depend on the actual list of runs used for the analysis (because polarization varies from fill to fill and degrades with time within a fill).

Triggers

PHENIX DAQ system is capable to collect up to ~6 thousand events per second. If the collision event rate is higher than that, PHENIX uses special triggers to tag more interesting events (e.g. ones with a high pT photon), keeping some fixed DAQ bandwidth fraction to collect minimum bias or other high rate events, using trigger scale down (or prescale) mechanism.

The Table below gives explanation for the general triggers used by PHENIX in Runs 9-16.

BBCLL1	Generated by coincidence of signals from North and South BBC, with particular requirement for the number of PMTs fired, e.g. **BBCLL1(>0 tubes)**; by default it includes a collision z-vertex cut of |z|<30cm; also it may not include vertex cut, i.e. **BBCLL1(>0 tubes) novertex** or include narrow vertex cut (varying from ±10 to ±15cm), i.e. **BBCLL1(>0 tubes) narrowvtx**. In dA and pA collisions BBC is also used to select most central collisions (usually 5-10% centrality) requiring higher threshold on the number of PMTs fired on A (south) side, e.g. **BBCLL1(> 1 tubes) central narrowvtx**, with >1tubes on the north and higher threshold on the south. In low energy or asymmetric collisions, one side trigger was used, e.g. **BBCLL1_N(>1 tubes)** for north side only
ZDCLL1	Generated by coincidence of signals from North and South ZDC; may be implemented with wide (**ZDCLL1wide**, implying |z|<150cm) or narrow (**ZDCLL1narrow**, implying |z|<30cm) vertex cut; "Blue logic" coincidence trigger is **ZDCNS** (no vertex cut). North and South triggers are generated and can be used separately, e.g. **ZDCN** for north arm
ERTLL1	Generated by energy in 2x2 or 4x4 overlapping sets of EMCal towers with summed energy above predefined threshold. There are 3 versions of 4x4 triggers allowing three different thresholds, in order from lowest to highest thresholds: **ERTLL1_4x4c**, **ERTLL1_4x4a** and **ERTLL1_4x4b**. 2x2 trigger can be used separately (usually with threshold lower than in 4x4 triggers), i.e. **ERTLL1_2x2** or in coincidence with signal in RICH detector, with fired EMCal and RICH trigger modules geometrically aligned, used for electron data, i.e. **ERTLL1_Electron** or **ERTLL1_E**
MPC	Generated by energy in 4x4 overlapping sets of MPC towers with summed energy above predefined threshold. Typically, threshold in 4x4B triggers was set up to pT>~3.5 GeV/c in $\sqrt{s}$=500 GeV runs, and to pT>~2.5 GeV/c in lower energy runs; and lower thresholds in 4x4a and 4x4c. It is generated separately in North and South arms, allowing setting three different thresholds (similar to ERT triggers, and similarly denoted as A, B, C), e.g. **MPC_N_A** for trigger version A in North arm. If arm (N or S) is not mentioned, it implies N|S, e.g. **MPC_A**

MUIDLL1	Generated by different (programmable) combinations of five MUID stations, with hits in different stations geometrically aligned. It is generated separately in North and South arms. **MUIDLL1_N1D** and **MUIDLL1_S1D** use "deep" tracks for muons, penetrating to the last MUID plane, in North and South, respectively. **MUIDLL1_N1H** and **MUIDLL1_S1H** use "shallow" tracks for hadrons, which stop before the last MUID plane. **MUIDLL1_N2D** and **MUIDLL1_S2D** are programmed for di-muon data, looking for two "deep" tracks.
RPC	Generated by RPC1 and/or RPC3 detectors, separately in North and South arms. RPC1 is subdivided radially onto B (inner) and C (outer) sectors. RPC3 is subdivided onto A (inner), B (middle) and C (outer) sectors, with separate trigger capability.
MUON_SG	Generated by hits in MuTr planes, aligned allowing different bent (sagitta). It is generated separately in North and South arms, with sagitta <=1 strip for the high pT track momenta (SG1) or <=3 strips for lower pT track momenta (SG3), e.g. **MUON_N_SG1** for high pT track momenta in North arm. It may include RPC, e.g. **MUON_N_SG1_RPC3A**
FVTX_HighMult	Generated when the number of hits in FVTX is higher than predefined threshold
UltraPeriph or UPC	Generated with ZDC & !BBC in coincidence with ERT_2x2. Instead of ERT_2x2, it can be in coincidence with MUIDLL1_2D triggers, e.g. **UltraPeriphMuon2DSouth**, or with MPC trigger, e.g. **UltraPeriphMPC.** Two ZDC arms may be included as N|S (as in case with ERT2x2) or as N&S (as in case with Muon2D)

In physics data taking we also used triggers which are products of logic operation between these triggers (formed in GL1 board), e.g. **ERT4x4c&BBCLL1**, which requires both ERT4x4c and BBCLL1 trigger fired.

Due to occasional problems with LL1 trigger boards, sometimes direct "Blue Logic" scheme was used to generate any particular trigger, instead of LL1, e.g. ERT instead of ERTLL1.

Logged event statistics with different triggers

Below we give numbers of logged (on tape) events from the main physics triggers, as obtained from scaled trigger accumulated statistics from run DB (without any QA). We also give average prescale factors (with 1 meaning no scale down), which were applied to triggers to avoid the DAQ bandwidth saturation, and hence the degradation of the trigger system lifetime. The tables below are supposed to give a general view of data flavor (selected with different triggers) and data amount available from different data sets.

Run16

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
AuAu 200 GeV	BBCLL1(> 1 tubes)	0.8 B	55	
	BBCLL1(> 1 tubes) narrowvtx	15 B	1.18	Several trigger copies are used (to implement non-integer scale down factors)
	BBCLL1(>1 tubes) novertex	63 M	1.7 k	
	ZDCNS	60 M	3.2 k	There was also ZDCLL1wide and ZDCLL1narrow
	ERT_4x4b	160 M	1	Thresh ~ 3.5 GeV
	UltraPeriph	0.12 B	76	ERT_2x2 thresh ~ 1 GeV
	UltraPeriphMPC	32 M	32	
	UltraPeriphMuon2DSouth	69 M	12	
	UltraPeriphMuon2DNorth	107 M	10	
dAu 200 GeV	BBCLL1(> 0 tubes) narrowvtx	68 M	565	
	BBCLL1(> 0 tubes) central narrowvtx	1.15 B	2.1	Central coll.: N_{bbcS}>42
	BBCLL1(>0 tubes) novertex	0.15 B	1k	
	ZDCNS	8 M	5k	There was also ZDCLL1wide
	ERT_4x4b	33 M	1	Thresh ~ 4 GeV
	MPC_N_B	150 M	1	d-side
	MPC_N_A	280 M	2.8	
	MUIDLL1_N2D&BBCLL1 narrowvtx	24 M	1	
	MUIDLL1_S2D&BBCLL1 narrowvtx	14 M	1	
	MUIDLL1_N2D&BBCLL1	13 M	4.9	
	MUIDLL1_S2D&BBCLL1	12 M	3.0	
dAu 62 GeV	BBCLL1(> 1 tubes) narrowvtx	0.38 B	12	Much more scaled down after run 455983
	BBCLL1(> 1 tubes) central narrowvtx	0.57 B	1	Central coll.: N_{bbcS}>30
	BBCLL1(>0 tubes)	5 M	2.1k	
	BBCLL1(>0 tubes) novertex	11 M	1.8k	
	ZDCNS	2 M	845	There was also ZDCLL1wide
	ERT_4x4b	1.1 M	1	
	ERT_4x4a	2.8 M	1	

	MPC_N_B	37 M	~1	
	MUIDLL1_N2D&BBCLL1	0.3 M	1	
	MUIDLL1_N2D&BBCLL1	1.9 M	1	
	FVTX_NS&BBCS_central	0.57 B	2.3	From run 455983. Alternative to "BBCLL1(> 1 tubes) central narrowvtx" trigger
dAu 19 GeV	BBCLL1(>0 tubes)	0.15 B	1	
	BBCLL1(>0 tubes) narrowvtx	48 M	1	
	BBCLL1(>0 tubes) novertex	14 M	87	
	FVTX_NS&BBC_S(>0)	0.57 B	2.3	Alternative to "BBCLL1(>0 tubes)" trigger
	FVTX_NS&BBCS_central	0.38 B	1	Alternative to "BBCLL1(> 0 tubes) central narrowvtx" trigger
dAu 39 GeV	BBCLL1(>0 tubes) narrowvtx	49 M	25	
	BBCLL1(>0 tubes)_central_narrowvtx	0.15 B	1	Central coll.: N_{bbcS}>28
	BBCLL1(>0 tubes)	5 M	724	
	BBCLL1(>0 tubes) novertex	25 M	282	
	ERT_4x4b	0.8 M	1	
	ERT_4x4a	1.8 M	1	
	FVTX_NS&BBC_S(>0)	0.9 B	6.4	Alternative to "BBCLL1(>0 tubes)" trigger
	FVTX_NS&BBCS_central	0.8 B	1	Alternative to "BBCLL1(> 0 tubes) central narrowvtx" trigger

Note, AuAu 200 GeV has two running periods: Feb 6 – Mar 9 and Jun 18 – Jun 27, 2016. In dAu runs, north is d-going direction and south is Au-going direction.

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **dAu 62 GeV**: FVTX_S, FVTX_NS, MPC_N_A, BBC_S(>3), MUIDLL1_S1D&BBCLL1 narrowvtx, MUIDLL1_N1D&BBCLL1 narrowvtx ;
In **dAu 19 GeV**: ZDCwide, ZDCNS, FVTX_S, FVTX_NS, FVTX_NS&BBC_S(>3), BBC_S(>3);
In **dAu 39 GeV**: ZDCwide, ZDCNS, FVTX_S, FVTX_NS, BBC_S(>3);

Run 15

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
pp 200 GeV	BBCLL1(> 1 tubes)	0.25 B	5770	
	BBCLL1(>0 tubes) novertex	0.3 B	8537	
	BBCLL1(>0 tubes) narrowvtx	2.7 B	202	
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.6 B	614	Local pol. trigger
	ZDCNS	0.16 B	208	There was also ZDCLL1wide
	ERT_4x4b	0.29 B	1	Thresh ~ 2.8 GeV
	ERT_4x4a&BBCLL1	1.45 B	1.24	Thresh ~ 2.1 GeV
	ERT_4x4c&BBCLL1	1.7 B	1.64	Thresh ~ 1.4 GeV
	ERTLL1_E&BBCLL1(narrow)	0.37 B	1.14	Electron trigger with ERT_2x2 threshold 1.0 GeV
	FVTX_HighMult_N_AND_S&BBCLL1narrow	0.09 B	1.2	From run 425931
	FVTX_HighMult_N_OR_S&BBCLL1narrow	0.4 B	6.9	From run 425931
	MPC_N_S_A	2.9 B	1.4	This is N|S
	MPC_S_B	0.8 B	1	
	MPC_N_B	1.1 B	1	
	MPC_S_C&ERTLL1_2x2	38 M	1	
	MPC_N_C&ERTLL1_2x2	45 M	1	
	MPC_S_C&MPC_S_C	13 M	1	Two cluster trigger
	MPC_N_C&MPC_N_C	17 M	1	Two cluster trigger
	MUIDLL1_N2D&BBCLL1novtx	22 M	1	
	MUIDLL1_S2D&BBCLL1novtx	11 M	1	
	MUIDLL1_N1D&BBCLL1novtx	0.3 B	14	
	MUIDLL1_S1D&BBCLL1novtx	0.27 B	8	
	MUON_N_SG3&MUIDLL1_(1D||1H)&BBCLL1novtx	0.98 B	1.04	
	MUON_S_SG3&MUIDLL1_(1D||1H)&BBCLL1novtx	0.28 B	1	
	MUON_N_SG3&BBCLL1novtx	0.12 B	936	
	MUON_S_SG3&BBCLL1novtx	0.12 B	165	
pAu 200 GeV	BBCLL1(>0 tubes)	0.12 B	2517	
	BBCLL1(>0 tubes) novertex	0.13 B	4706	

	BBCLL1(>0 tubes) narrowvtx	1.08 B	110	
	BBCLL1(>0 tubes)_central35_narrowvtx	2.1 B	2.7	Central coll.: N_{bbcS}>35
	FVTX_HighMult_N&BBCLL1(narrow)	0.22 B	1.1	From run 432896
	FVTX_HighMult_S&BBCLL1(narrow)	0.28 B	7	From run 432896
	ZDCNS	68 M	237	There was also ZDCLL1wide trigger
	ZDCS	0.12 B	8 k	
	ZDCN	0.21 B	193	
	ERT_4x4b	60 M	1	Thresh ~ 3.5 GeV
	ERT_4x4a&BBCLL1	0.21 B	~1	Thresh ~ 2.8 GeV
	ERT_4x4c&BBCLL1(narrow)	0.26 B	1.04	Thresh ~ 2.1 GeV
	ERTLL1_E&BBCLL1(narrow)	0.12 B	1	Electron trigger with ERT_2x2 thresh 1.2 GeV
	MPC_N_A	1.5 B	1.1	Turned off for run>435836
	MPC_S_A	0.07 B	10	Turned off for run>433600
	MPC_N_B	0.55 B	1.0	Turned off for run>435836
	MPC_S_C&ERTLL1_2x2	2 M	1	Turned off for run>433600
	MPC_N_C&ERTLL1_2x2	19 M	1	Turned off for run>435836
	MUIDLL1_N2D&BBCLL1	0.21 B	1.07	All MUIDLL1 and MUON triggers are for runs >= 434134; before that they were with BBCLL1narrow or BBCLL1novertex
	MUIDLL1_N2D&BBCLL1	0.06 B	1	
	MUIDLL1_N1D&BBCLL1	0.17 B	6.0	
	MUIDLL1_S1D&BBCLL1	0.18 B	12	
	MUON_N_SG3&MUIDLL1_(1D||1H)&BBCLL1	0.13 B	1	
	MUON_S_SG3&MUIDLL1_(1D||1H)&BBCLL1	0.28 B	1.02	
	MUON_N_SG3&BBCLL1	51 M	62	
	MUON_S_SG3&BBCLL1	38 M	172	
pAl 200 GeV	BBCLL1(>0 tubes)	47 M	5373	
	BBCLL1(>0 tubes) novertex	45 M	10 k	
	BBCLL1(>0 tubes) narrowvtx	0.52 B	194	
	BBCLL1(>0 tubes)_central25_narrowvtx	1.3 B	2.7	Central coll.: N_{bbcS}>25

	FVTX_HighMult_N&BBCLL1(narrow)	83 M	1.6	
	FVTX_HighMult_S&BBCLL1(narrow)	95 M	4.2	
	ZDCNS	23 M	720	There was also ZDCLL1wide trigger
	ZDCS	43 M	11 k	
	ZDCN	73 M	236	
	ERT_4x4b	23 M	1	Thresh ~ 3.5 GeV
	ERT_4x4a&BBCLL1	70 M	1.01	Thresh ~ 2.8 GeV
	ERT_4x4c&BBCLL1(narrow)	110 M	1.01	Thresh ~ 2.1 GeV
	ERTLL1_E&BBCLL1(narrow)	70 M	1	Electron trigger with ERT_2x2 thresh 1.2 GeV
	MUIDLL1_N2D&BBCLL1	35 M	1	
	MUIDLL1_S2D&BBCLL1	4 M	1	
	MUIDLL1_N1D&BBCLL1	52 M	19	
	MUIDLL1_S1D&BBCLL1	49 M	11	
	MUIDLL1_N1H&BBCLL1	48 M	16	
	MUIDLL1_S1H&BBCLL1	34 M	17	
	MUON_N_SG3&MUIDLL1_(1D||1H)&BBCLL1	89 M	1	
	MUON_S_SG3&MUIDLL1_(1D||1H)&BBCLL1	64 M	1	
	MUON_N_SG3&BBCLL1	16 M	246	
	MUON_S_SG3&BBCLL1	19 M	150	

In pA runs, north is p-going direction and south is A-going direction.
MPC was damaged during pAu run, so that the MPC-south was turned off from run>433600, and MPC-north from run>435836, and hence was not available in pAl run.

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **pAl 200 GeV**: ZDC_N&&FVTX_HighMult_N .

Run14

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
AuAu 15 GeV	BBCLL1(> 1 tubes)	23 M	1	
	BBCLL1(>0 tubes) novertex	0.29 B	4.3	High rate in runs<403600 => large background
	ZDCNS	1M	1	There was also ZDCLL1wide and ZDCLL1narrow
	ERT_2x2	27 M	1	Thresh~0.6 GeV. Good after run 404862
AuAu 200 GeV	BBCLL1(>1 tubes) narrowvtx	19 B	1.14	Several trigger copies are used (to implement non-integer scale down factors). After run 407147 vertex cut changed from 12cm to 10cm
	BBCLL1(>1 tubes)	3.5 B	13.5	
	BBCLL1(>1 tubes) novertex	0.36 B	292	
	ZDCNS	0.15 B	1.2k	There was also ZDCLL1wide and ZDCLL1narrow
	ERT_4x4b&BBCLL1	0.21 B	1	Thresh ~ 3.5 GeV
	ERT_4x4b	0.25 B	1	Thresh ~ 3.5 GeV
	UltraPeriph	0.36 B	1	ERT_2x2 thresh~1 GeV. Wrong setup in runs <= 410722
	UltraPeriphMuon2DSouth	84 M	1	
	UltraPeriphMuon2DNorth	64 M	1	
	UltraPeriphMPC	0.7 B	1	Wrong setup in runs <= 410722
He3Au 200 GeV	BBCLL1(>0 tubes) narrowvtx	2.75 B	7.6	
	BBCLL1(>0 tubes)	0.1 B	447	
	BBCLL1(>0 tubes) novertex	10 M	9.3k	
	BBCLL1(>0 tubes)_central48_narrowvtx	0.87 B	1	Central coll.: N_{bbcS}>48. For runs >= 415488
	BBCLL1(>0 tubes)_central49_narrowvtx	0.69 B	1	Central coll.: N_{bbcS}>49. For runs >= 415488
	ZDCNS	17 M	862	There was also ZDCLL1wide and ZDCLL1narrow
	ERTLL1_4x4a&BBCLL1	19 M	1	Thresh ~ 3.5 GeV
	ERT_4x4b&BBCLL1	6.6 M	1	Thresh ~ 4 GeV
	ERT_4x4c&BBCLL1	36 M	1.5	Thresh ~ 2.8 GeV
	ERTLL1_Electron&BBCLL1 narrow	93 M	1.2	ERT_2x2 thresh~1.2 GeV
	ERT_4x4b	8.4 M	1	Thresh ~ 4 GeV

	ERTLL1_4x4a	22 M	1	Thresh ~ 3.5 GeV
	MUIDLL1_N2D&BBCLL1	26 M	1	
	MUIDLL1_S2D&BBCLL1	67 M	1.5	
	(MUIDLL1_N1D&S1D)&BBCLL1	16 M	1	
	MPCB_N	19 M	1	

In AuAu 15 GeV, there is also a set of BBCLL1(>1 tubes) triggers (in addition to “>0 tubes” triggers).

Run13

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
pp 510 GeV	BBCLL1(> 1 tubes)	0.14 B	35k	
	BBCLL1(>0 tubes) novertex	1.1 B	7.5k	
	BBCLL1(>0 tubes) narrowvtx	0.6 B	4k	
	ZDCNS	0.12 B	4.9k	There was also ZDCLL1wide
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.54 B	7.3k	Local polarimeter trigger
	ERT_4x4b	0.30 B	1	Thresh ~ 5.6 GeV
	ERT_4x4a&BBCLL1(noVtx)	1.2 B	~1.5	Thresh ~ 4.7 GeV
	ERT_4x4c&BBCLL1(noVtx)	2.2 B	~3	Thresh ~ 3.7 GeV
	ERTLL1_E&BBCLL1(narrow)	1.1 B	~3	Electron trigger
	MPC_B	0.62 B	1.1	
	MPC_A	3.2 B	1.2	
	MPC_C&ERT_2x2	0.5 B	1.1	Two particle correlation trigger
	(MPCS_C&MPCS_C)||(MPCN_C&MPCN_C)	28 M	1	Two particle correlation trigger
	((MUIDLL1_N2D||S2D)||(N1D&S1D))&BBCLL1(noVtx)	0.6 B	1.1	Di-muon trigger
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.75 B	74	Single muon trigger
	SG3&MUID_1H_N||S	0.24 B	131	
	SG3&RPC3&MUID_1D_N||S	1.1 B	9	
	SG1+RPC1(C)&MUIDLL1_N||S	0.3 B	1	
	RPC1+RPC3_S	0.16 B	475	
	RPC1+RPC3_N	0.18 B	711	
	MUON_S_SG1_RPC3A&MUID_S1D	68 M	1	
	MUON_N_SG1_RPC3A&MUID_N1D	145 M	1	
	MUON_S_SG1&BBCLL1(noVtx)	169 M	4.6k	
	MUON_N_SG1&BBCLL1(noVtx)	135 M	18k	
	MUON_S_SG1_RPC3_1_B||C	0.34 B	1	
	MUON_N_SG1_RPC3_1_B||C	0.39 B	1	

"+" in trigger names means that trigger signals from different detectors are combined on LL1 level (e.g. SG1+RPC1), with exact algorithm described elsewhere; usually hits are checked to be aligned azimuthally.

Run12

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
pp 200 GeV	BBCLL1(> 1 tubes)	79 M	3k	
	BBCLL1(>0 tubes) novertex	0.45 B	1k	
	BBCLL1(>0 tubes) narrowvtx	0.32 B	344	
	ZDCNS	0.12 B	54	There was also ZDCLL1wide
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.18 B	250	Local polarimeter trigger
	ERT_4x4b	72 M	1	Thresh ~ 2.8 GeV
	ERT_4x4a&BBCLL1	0.32 B	1.2	Thresh ~ 2.1 GeV
	ERT_4x4c&BBCLL1(narrow)	0.44 B	1.3	Thresh ~ 1.4 GeV
	ERTLL1_E	0.34 B	6	Electron trigger, ERT_2x2 thresh ~0.6 GeV
	ERTLL1_E&BBCLL1(narrow)	0.48 B	~1	
	MPC_B	0.43 B	~1.2	
	MPC_A	0.69 B	1.1	
	MPCN_C&ERT_2x2	0.17 B	1	Two particle correlation trigger
	MPCS_C&ERT_2x2	79 M	~1	From run 360439
	MPCS_C & MPCS_C	14 M	1	Two particle correlation trigger
	((MUIDLL1_N2D||S2D)||(N1D&S1D))&BBCLL1(noVtx)	0.14 B	1	Di-muon trigger
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.31 B	2.7	Single muon trigger
pp 510 GeV	BBCLL1(>0 tubes)	68 M	15k	
	BBCLL1(>0 tubes) novertex	0.27 B	6k	
	BBCLL1(>0 tubes) narrowvtx	0.14 B	3.5k	
	ZDCNS	64 M	2.2k	There was also ZDCLL1wide
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.13 B	5.8k	Local polarimeter trigger
	ERT_4x4b	70 M	1	Thresh ~ 5.6 GeV
	ERT_4x4a&BBCLL1	0.22 B	1.2	Thresh ~ 4.7 GeV
	ERT_4x4c&BBCLL1(narrow)	0.48 B	3.3	Thresh ~ 3.7 GeV
	ERTLL1_E	30 M	104	Electron trigger, ERT_2x2 thresh ~1.3 GeV
	ERTLL1_E&BBCLL1(narrow)	0.30 B	3.1	
	MPC_B	0.26 B	1.04	
	MPC_A	0.54 B	1.6	

	MPC_C&ERT_2x2	0.11 B	1.3	Two particle correlation trigger
	(MPCS_C & MPCS_C)||(MPCN_C & MPCN_C)	12 M	~1	Two particle correlation trigger
	((MUIDLL1_N2D||S2D)||(N1D&S1D))&BBCLL1(noVtx)	0.12 B	1.1	Di-muon trigger
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.18 B	52	Single muon trigger
	(MUON_S_SG1&MUIDLL1_S1D)||(MUON_N_SG1&MUIDLL1_N1D)&BBCLL1(noVtx)	0.48 B	1.4	
	(MUON_N_SG3&MUIDLL1_N1H)||(MUON_S_SG3&MUIDLL1_S1H)&BBCLL1(noVtx)	79 M	21	
	MUON_S_SG3&MUIDLL1_S1D&BBCLL1(noVtx)	0.12 B	3.3	
	MUON_N_SG3&MUIDLL1_N1D&BBCLL1(noVtx)	0.11 B	15	
	MUON_S_SG3&BBCLL1(noVtx)	23 M	3.5k	For runs<366052 was taken with BBCLL1
	MUON_N_SG3&BBCLL1(noVtx)	19 M	12k	For runs<366052 was taken with BBCLL1
	MUON_S_SG1&BBCLL1(noVtx)	25 M	1.8k	For runs<366052 was taken with BBCLL1
	MUON_N_SG1&BBCLL1(noVtx)	18 M	4.2k	For runs<366052 was taken with BBCLL1
	MUON_S_SG1_RPC3_1_A||B||C&BBCLL1(noVtx)	98 M	1.1	
	MUON_N_SG1_RPC3_1_A||B||C&BBCLL1(noVtx)	0.46 B	1.4	
UU 193 GeV	BBCLL1(>1 tubes)	1.2 B	1	“narrowvtx” is also available
	BBCLL1(>1 tubes) novertex	1.7 B	1.4	
	ZDCNS	14 M	310	There was also ZDCLL1wide and ZDCLL1narrow
	ERT_4x4b	76 M	~1	Thresh ~ 2.8 GeV
	UPC_ERT_ZDCN|S	47 M	1	
	UPC_MUID2D_S_ZDCN&S	6.6 M	1	
	UPC_MUID2D_N_ZDCN&S	1.7 M	1	
	UPC_MUID2D_S	0.19 B	28	
	UPC_MUID2D_N	48 M	32	
	UPC_SG3_S_ZDCN|S	0.11 B	~1	
	UPC_SG3_N_ZDCN|S	31 M	1	

CuAu 200 GeV	BBCLL1(>1 tubes)	0.8 B	29	
	BBCLL1(>1 tubes) narrowvtx	8.1 B	1.74	Several trigger copies are used (to implement non-integer scale down factors).
	BBCLL1(>1 tubes) novertex	0.2 B	274	
	ZDCNS	37 M	1.3k	There was also ZDCLL1wide and ZDCLL1narrow
	ERT_4x4b	71 M	1	Thresh ~ 3.5 GeV
	ERT_4x4a&BBCLL1	0.22 B	1	Thresh ~ 2.8 GeV
	ERTLL1_E&BBCLL1 narrowvtx	0.26 B	1	Electron trigger, ERT_2x2 thresh ~ 1.4 GeV
	MUIDLL1_N2D&BBCLL1	0.19 B	1	
	MUIDLL1_S2D&BBCLL1	0.27 B	1	
AuAu 5 GeV				5 hours running only: low stat., likely heavily dominated by background

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **pp 200 GeV**: MUON_S_SG3 && MUIDLL1_1D && BBCLL1, MUON_S_SG3 && (MUIDLL1_S1D || S1H) && BBCLL1(noVtx), MUON_N_SG3 && MUIDLL1_1D && BBCLL1, MUON_N_SG3 && (MUIDLL1_N1D || N1H) && BBCLL1(noVtx), MUON_N_SG3&BBCLL1;
In **UU 193 GeV**: MUON_SG1_N&RPC1&RPC3, MUON_SG1_S&RPC1&RPC3

Run11

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
pp 500 GeV	BBCLL1(> 1 tubes)	67 M	9k	
	BBCLL1(>0 tubes) novertex	0.51 B	2k	
	BBCLL1(>0 tubes) narrowvtx	91 M	3.8k	
	ZDCwide	91 M	147	
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.16 B	2.9k	Local polarimeter trigger
	ERTLL1_4x4b	53 M	1	Thresh ~ 5.6 GeV
	ERTLL1_4x4a	0.18 B	1.5	Thresh ~ 4.7 GeV
	ERT_4x4c&BBCLL1(narrow)	0.44 B	1.3	Thresh ~ 3.7 GeV
	ERTLL1_E&BBCLL1(narrow)	0.27 B	3.9	Electron trigger, ERT_2x2 thresh ~1.3 GeV
	MPC4x4B	0.42 B	~1	
	MPC_A	0.55 B	~2	
	MPC4x4c&ERTLL1_2x2	83 M	~1.5	Two particle correlation trigger
	((MUIDLL1_N2D||S2D)||(N1D&S1D))&BBCLL1(noVtx)	0.18 B	1.04	Di-muon trigger
	(MUIDLL1_N1H||S1H)&BBCLL1(noVtx)	81 M	70	
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.39 B	21	
	MUON_N_SG1&BBCLL1(NoVtx)&MUIDLL1_N1D	0.31 B	~1	
	MUON_S_SG1&BBCLL1(NoVtx)&MUIDLL1_S1D	0.10 B	~1	
AuAu 19.6 GeV	BBCLL1(>0 tubes)	15 M	1	
	BBCLL1(>1 tubes)	13 M	1	
	BBCLL1(>0 tubes) novertex	72 M	2	
	BBCLL1(>1 tubes) novertex	55 M	2	
	BBCLL1_N(>1 tubes)	44 M	5	
	BBCLL1_S(>1 tubes)	37 M	5	
	ERTLL1_2x2	35 M	6	Thresh ~ 0.6 GeV
	ZDCNS	14 M	~1	There was also ZDCLL1wide and ZDCLL1narrow
AuAu 200 GeV	BBCLL1(>1 tubes) narrowvtx	5.2 B	1.18	Several trigger copies are used (to implement non-integer scale down factors).

	BBCLL1(>1 tubes)	2.1 B	5	
	BBCLL1(>1 tubes) novertex	0.33 B	67	
	ZDCLL1wide	92 M	560	There was also ZDCLL1narrow
	ERT_4x4b	69 M	1	Thresh ~ 3.5 GeV
	ERT_4x4b&BBCLL1	49 M	1	Thresh ~ 3.5 GeV
	ERT_4x4a&BBCLL1	0.21 B	1	Thresh ~ 2.8 GeV
	(ZDC_S||ZDC_N)&&!BBC	16 M	~10k	
	UltraPeriph	46 M	1	ERT_2x2 thresh ~ 1 GeV
	UltraPeriphMuon2DSouth	27 M	~2	
	UltraPeriphMuon2DNorth	19 M	~2	
	UltraPeriphMPC	6 M	~1	Many runs scaled down by 9999999
AuAu 27 GeV	BBCLL1(>0 tubes)	50 M	1	
	BBCLL1(>1 tubes)	45 M	1	
	BBCLL1(>0 tubes) novertex	194 M	1.3	
	BBCLL1(>1 tubes) novertex	161 M	1.3	
	BBCLL1_N(>1 tubes)	43 M	8.7	
	BBCLL1_S(>1 tubes)	42 M	8.7	
	ERTLL1_2x2	18 M	1	Thresh ~1 GeV
	ZDCNS	57 M	2.2	There was also ZDCLL1wide and ZDCLL1narrow

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **pp 500 GeV**:
(NRPCA||NRPCB||NRPCC), (SRPCA||SRPCB||SRPCC), MUON_N_RPCA, MUON_N_RPCB, MUON_N_RPCC, MUON_S_RPCA, MUON_S_RPCB, MUON_S_RPCC
In **AuAu 200 GeV**:
MuTrigLL1_SG5 and its different combinations with BBC, ZDC, RPC

Run10

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
AuAu 200 GeV	BBCLL1(>1 tubes)	5.7 B	1.7	
	BBCLL1(>1 tubes)narrow	6.2 B	1.26	Looks like only slightly narrower
	BBCLL1(>1 tubes) novertex	68 M	282	
	ZDCLL1wide	0.11 B	311	There was also ZDCLL1narrow
	ERTLL1_4x4b&BBCLL1	37 M	1	Thresh ~ 2.8 GeV
	UltraPeriph	64 M	~1	ERT_2x2 thresh ~ 1 GeV
	UltraPeriphMuon2DSouth	87 M	2.2	
	UltraPeriphMuon2DNorth	72 M	1.9	
	UltraPeriphMPC	50 M	1.4	
AuAu 62 GeV	BBCLL1(>0 tubes)	0.7 B	1	
	BBCLL1(>0 tubes) novertex	0.22 B	7.7	
	ZDCLL1wide	0.20 B	11	There was also ZDCLL1narrow
	MUIDLL1_N2D&BBCLL1	12 M	1	
	MUIDLL1_S2D&BBCLL1	11 M	1	
	UltraPeriph	6 M	1	ERT_2x2 thresh ~ 1 GeV
	UltraPeriphMuon2DSouth	0.5 M	1	
	UltraPeriphMuon2DNorth	3 M	1	
	UltraPeriphMPC	0.4 M	1	
AuAu 39 GeV	BBCLL1(>0 tubes)	0.25 B	1	
	BBCLL1(>0 tubes) novertex	0.22 B	3.2	
	ZDCLL1wide	0.16 B	4.8	There was also ZDCLL1narrow
	ERTLL1_2x2	01.0 B	~1	Thresh ~ 1 GeV
	MUIDLL1_N2D&BBCLL1	1.7 M	1	
	MUIDLL1_S2D&BBCLL1	1.5 M	1	
AuAu 7.7 GeV	BBCLL1(>0 tubes)	1.7 M	1	
	BBCLL1(>1 tubes)	1.5 M	1	
	BBCLL1(>0 tubes) novertex	14 M	1	
	BBCLL1(>1 tubes) novertex	8.4 M	1	
	BBCLL1_N(>1 tubes)	16 M	1	
	BBCLL1_S(>1 tubes)	16 M	1	

	(BBCLL1_N|BBCLL1_S) & !BBCLL1(>1 tubes)	25 M	1	
	ZDCLL1wide	0.3 M	1	There was also ZDCLL1narrow

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **AuAu 7.7 GeV**:
RxNP, RxNP&BBCLL1, RxNP||BBCLL1

Run9

Species and $\sqrt{s_{NN}}$	Trigger	N_{logged}	<Prescale>	Comment
pp 500 GeV	BBCLL1(>0 tubes)	0.10 B	3.6k	
	BBCLL1(>0 tubes) novertex	0.28 B	2.2k	
	ZDCLL1wide	0.11 B	0.5k	There was also ZDCLL1narrow and ZDCN||ZDCS
	BBCLL1(noVtx)&(ZDCN||ZDCS)	67 M	3.9k	Local polarimeter trigger
	ERT_4x4b	61 M	1	Thresh ~5.6 GeV
	ERT_4x4a	42 M	1.4	Thresh ~4.7 GeV
	ERT_4x4c	0.50 B	3.2	Thresh ~3.7 GeV
	ERTLL1_4x4c&BBCLL1(noVtx)	0.22 B	1.5	Thresh ~3.7 GeV
	ERTLL1_4x4c&BBCLL1	0.24 B	1.0	Thresh ~3.7 GeV
	ERTLL1_2x2	0.20 B	26	Thresh ~1.3 GeV
	ERTLL1_2x2&BBCLL1(noVtx)	0.15 B	27	Thresh ~1.3 GeV
	ERTLL1_2x2&BBCLL1	0.30 B	11	Thresh ~1.3 GeV
	ERTLL1_E	0.28 B	1.5	Electron trigger, ERT_2x2 thresh ~1.3 GeV
	ERTLL1_E&BBCLL1(noVtx)	0.17 B	1.9	
	(MUIDLL1_N2D||S2D)&BBCLL1(noVtx)	77 M	1	
	(MUIDLL1_N1D||S1D)&ERT_2x2	66 M	1	
	(MUIDLL1_N2D||S2D)&(ZDCN||ZDCS)	57 M	13	From run 277979
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.26 B	27	
	(MUIDLL1_S1H)&BBCLL1(noVtx)	57 M	55	From run 276385
	(MUIDLL1_N1H)&BBCLL1(noVtx)	63 M	~60	From run 276385
	(MUIDLL1_N1D&S1D)&BBCLL1(noVtx)	56 M	1	
	MPC_4x4A	0.25 B	1.3	
	MPC_2x2(PT)	0.19 B	~3	
	MPC_4x4C&ERTLL1_2x2	0.14 B	1	Two particle correlation trigger
pp 200 GeV	BBCLL1(>0 tubes)	1.25 B	291	
	BBCLL1(>0 tubes) novertex	0.91 B	717	

	ZDCLL1wide	0.29 B	25	There was also ZDCLL1narrow and ZDCN||ZDCS
	BBCLL1(noVtx)&(ZDCN||ZDCS)	0.14 B	439	Local polarimeter trigger
	ERT_4x4b	0.19 B	1	Thresh ~2.8 GeV
	ERT_4x4a	0.53 B	~2	Thresh ~2.1 GeV
	ERTLL1_4x4a&BBCLL1(noVtx)	0.37 B	~1.3	Thresh ~2.1 GeV
	ERTLL1_4x4a&BBCLL1	0.39 B	1	Thresh ~2.1 GeV
	ERTLL1_4x4c&BBCLL1(noVtx)	2.1 B	1.3	Thresh ~1.4 GeV
	ERTLL1_4x4c&BBCLL1	2.3 B	1.1	Thresh ~1.4 GeV
	ERTLL1_2x2&BBCLL1(noVtx)	0.35 B	59	Thresh ~0.6 GeV
	ERTLL1_2x2&BBCLL1	0.30 B	58	Thresh ~0.6 GeV
	ERTLL1_E	0.63 B	6.7	Electron trigger, ERT_2x2 thresh ~0.6 GeV
	ERTLL1_E&BBCLL1(noVtx)	1.5 B	1.0	
	(MUIDLL1_S1H)&BBCLL1(noVtx)	0.13 B	16	
	(MUIDLL1_N1H)&BBCLL1(noVtx)	0.15 B	17	
	(MUIDLL1_N2D||S2D)&BBCLL1(noVtx)	17 M	1	
	(MUIDLL1_N1D&S1D)&BBCLL1(noVtx)	11 M	1	
	(MUIDLL1_N2D||S2D)&(ZDCN||ZDCS)	2.7 M	1	
	(MUIDLL1_N1D||S1D)&ERT_2x2	0.16 B	~1	
	(MUIDLL1_N1D||S1D)&BBCLL1(noVtx)	0.27 B	13	
	MPC_4x4A	0.35 B	1	
	MPC_2x2(PT)	0.42 B	1.4	Trigger for pT
	MPC_4x4C&ERTLL1_2x2	0.32 B	1.2	

Some limited data with other triggers were collected for service, monitoring or test purposes:
In **pp 500 GeV**:
Different combinations of MPCRLT and BBCRTL (for “relative lum. telescope”), (MUIDLL1_S1H)&BBCLL1(noVtx)
In **pp 200 GeV**:
MPCRLTN&BBCRTLN (for “relative lum. telescope”)