

Run 20 RHIC Machine/Experiments Meeting

February 25, 2020

Agenda:

- General discussion of Run 20 & Start of 9.2 GeV running - W. Christie
- Collider Update - C. Liu
- LEReC Update - A. Fedotov
- STAR Status/update - J.H. Lee
- All Other Business (AOB)

BLUEJEANS CONNECTION INFO:

To join the meeting on a computer or mobile phone: <https://bluejeans.com/273705843/1875?src=calendarLink>

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Global Numbers: <http://bluejeans.com/numbers>

Meeting ID: 273 705 843

RHIC Run FY20 Run Schedule

(Revision date: 12/10/19)

Program Element	Calendar 2019				Calendar 2020						
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July
RHIC Cryo warm scrub starts October 7 th											
RHIC Cryo 45 K cool down (Nov 4 th – Dec 1 st)					← Dec 7 th					Warm up June 15-16	
RHIC Cryo 4.5 K cool down starts December 2 nd											
RHIC Cryo off June 17 th											
EBIS Startup Sept 3 rd , Booster Startup Sept 16 th , AGS Startup Nov 11 th											
LEReC ready on Feb 29 th , 4 wks 7.7 GeV/n TBD											
RHIC setup/commissioning (12/5 – 12/10)											
RHIC physics $\sqrt{s} = 11.5$ GeV/n AuAu (12/10 – 2/23, no LEReC, 2 days 3.5 GeV FXT on TBD)			Dec 10 th →								
RHIC physics $\sqrt{s} = 9.2$ GeV/n AuAu (2/29 – 5/31, LEReC, 3.2 GeV FXT done in Run-19)											
RHIC physics for five more FXT energies AuAu and one week CeC (6/1 – 6/15)											
NSRL Operations (Sept 23 rd – June 15 th)											
LINAC (Setup Dec 19 th , Beam Dec 26 th)											
BLIP Isotopes (Dec 26 th – June 15 th)											
Tandem Operations (Sept 23 rd – Feb 23 rd)											

N.B. The Schedule above assumes that RHIC Run 2020 will be 28 Cryo weeks long.

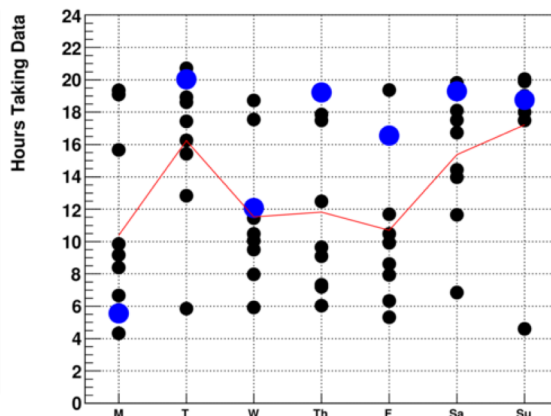
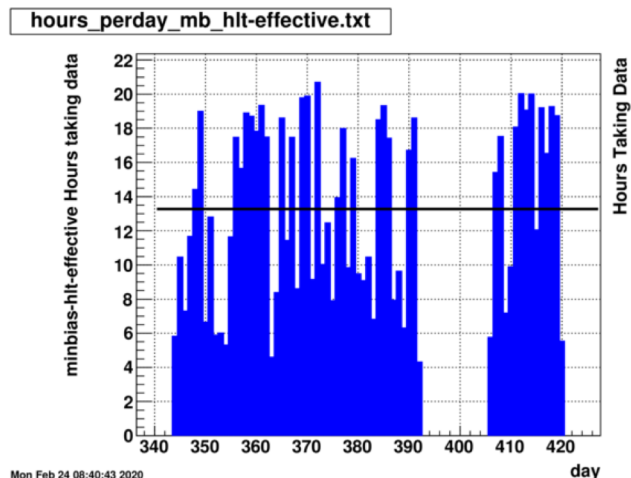
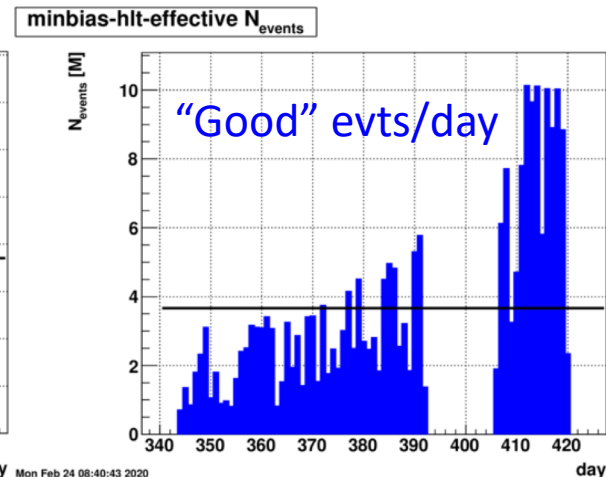
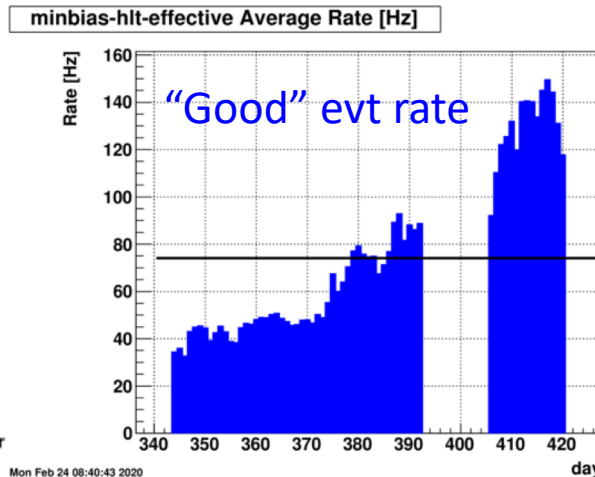
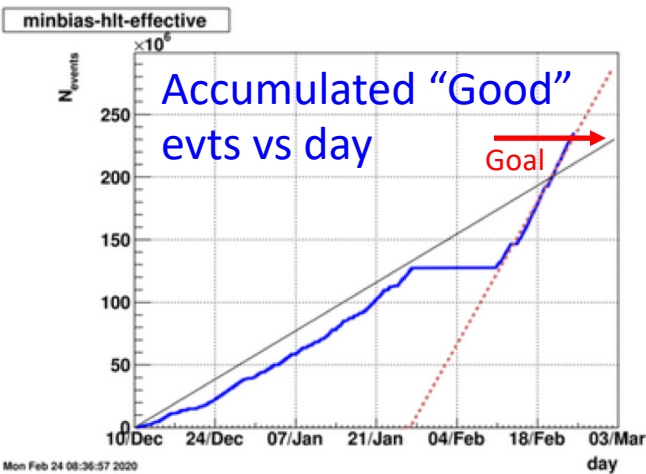
N.B. 11.5 GeV running ended on Monday, February 24th. The 9.2 GeV running started later that day.

STAR Beam Use Request for Run20

	Beam Energy (GeV/nucleon)	$\sqrt{s_{NN}}$ (GeV)	μ_B (MeV)	Run Time	Number Events requested / collected	
	9.8	19.6	205	4.5 weeks	400M 582M	Done
	7.3	14.5	260	5.5 weeks	300M 324M	Done
Run20	5.75	11.5	315	9.5 weeks	230M ~ 235	Done
	4.55	9.1	370	9.5 weeks	160M ~ 1	Mevts at present
	3.85	7.7	420	12 weeks	100M	
Run20	31.2	7.7 (FXT)	420	2 days	100M	Done
	19.5	6.2 (FXT)	487	2 days	100M	Done
	13.5	5.2 (FXT)	541	2 days	100M	Done
	9.8	4.5 (FXT)	589	2 days	100M	Done
	7.3	3.9 (FXT)	633	2 days	100M	Done
	5.75	3.5 (FXT)	666	2 days	100M	Done
	4.55	3.2 (FXT)	699	2 days	100M 201M	Done
	3.85	3.0 (FXT)	721	2 days	100M 3.7M+300M (run18)	Done

- Top priority for Run20 is measuring next two energies in BES-II at $\sqrt{s_{NN}} = 11.5$ GeV and 9.2 GeV
- Finishing **fixed target** measurements at $\sqrt{s_{NN}} = 3.5, 3.9, 4.5, 5.2, 6.2, 7.7$ GeV

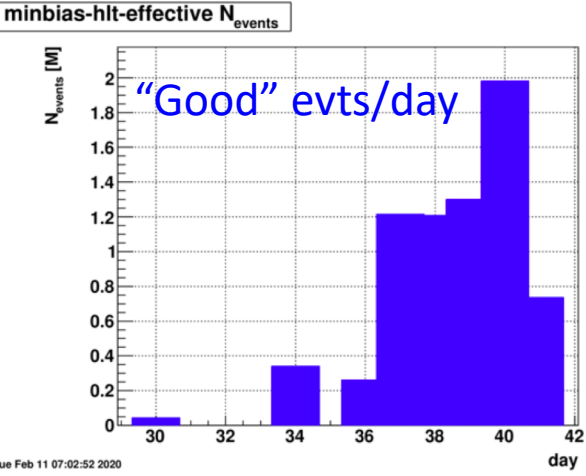
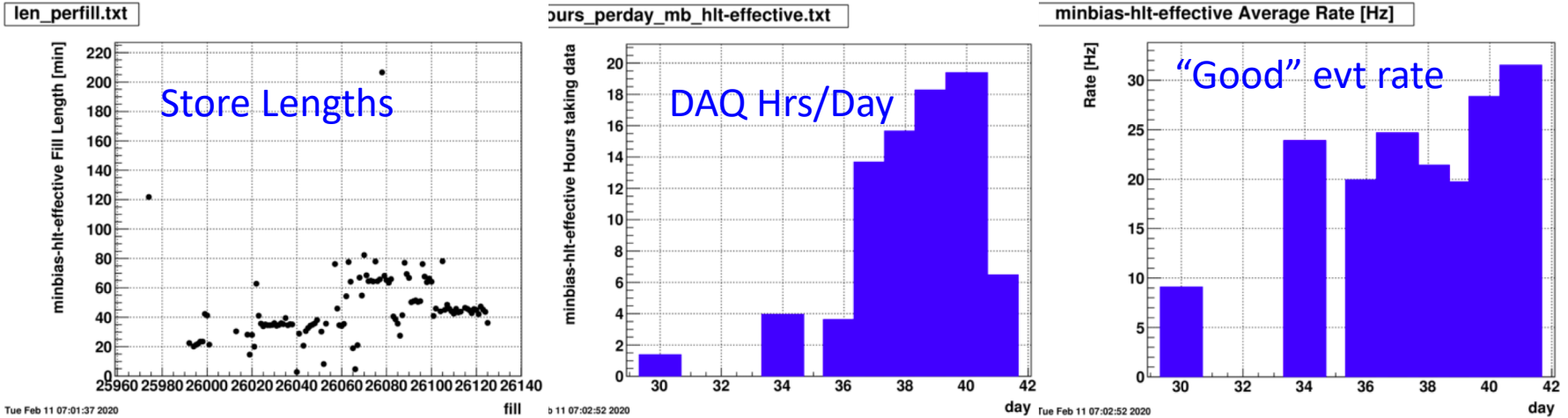
Successful conclusion to collisions at 11.5 GeV



Averaged just over 13 hrs/day of STAR DAQ running time through the 11.5 GeV run.

- Data set goal of 230 M "Good" events was reached ~ 4 pm on Sunday, February 24th.
- The 11.5 GeV Physics run was concluded at ~7:30 am on Monday February 25th. **Total of ~235 Mevts accumulated.**
- After an access to reconfigure RF parameters, setup and Physics running for 9.2 GeV commenced Monday evening.

Estimate for how long it will take to collect the 9.2 GeV data set



Estimates based on *observed* (2/7- 2/10) performance:

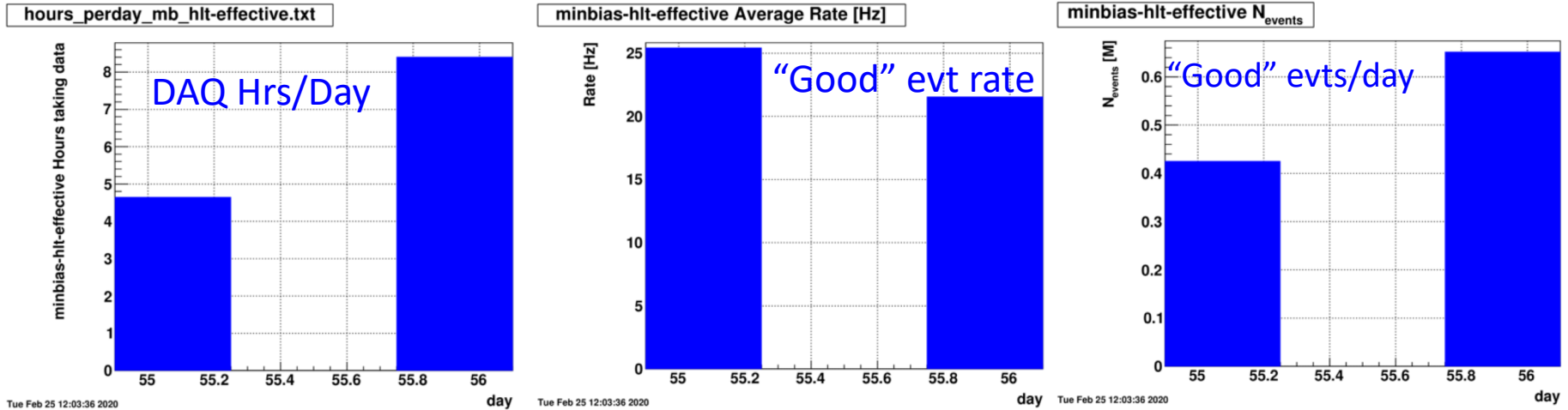
If one assumes 15 Hrs/day of DAQ running, at an average rate of 33 Hz:

- 15 hrs/day x 3600 sec/hr x 33 evts/sec = 1.8 Mevts/day
- Data set goal is 160 M "good" evts (Currently have 7 Mevts)
- 153 Mevts/1.8 Mevts/day = 85 days = 12.4 wks
- Add 6 maintenance half/days makes estimate ~ **13 wks**

Reasons to believe that the estimate above is realistic:

- After only a few days of optimization, 2 M "good" evts were recorded in a day
- There was a store that had an average "good" event rate of 38 Hz
- Historically, the RHIC luminosity takes weeks of running to reach luminosity plateau

Preliminary look at 9.2 GeV running since February 25th Start



These are **very early looks** at the just commencing (last evening) 9.2 GeV Physics running:

- Total of about 13 hrs of STAR DAQ running. About equivalent to one full day.
- 1.08 M "Good" events collected in this ~ one day of initial running.
- To achieve the rates used in the previous slide, which estimates about 13 weeks of running to reach the 160 M "Good" events goal for the 9.2 GeV run, the store averaged rate needs to increase by about 44% (from ~ 23 Hz up to about 33 Hz).

We can expect to have a much better idea how 9.2 GeV Physics run will proceed by next's weeks meeting.

A possible Scenario for how the rest of Run 2020 might proceed

January						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

March						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Start 9.2 GeV Physics running Monday evening, February 25th.

With **observed** rates for 9.2 GeV collisions, we should be able to achieve the full 130 Mevts goal after ~ 13 weeks of “straight” (uninterrupted) running. This gets one to May 26th.

12 days of 7.7 GeV LEReC commissioning gets one to June 8th.

8 days of CeC then gets one to June 15th, the end of a 28 Cryo week run (N.B. assumption of 28 Cryo week run).

N.B. The 9.2 GeV Physics running, 7.7 GeV LEReC commissioning, and CEC time may well be run in an interleaved mode from March to the end of the run.

All Other Business (AOB)