Projections for 7.7 GeV Collider Data Set

3 Proposed Program

4 Completion of the BES-II Program

Table 1: Achieved and projected experiment performance criteria for the BES-II collider program.

Collision Energy (GeV)	7.7	9.2	11.5	14.6	17.1	19.6	27
Performance in BES-I	2010	NA	2010	2014	NA	2011	2011
Good Events (M)	4.3	NA	11.7	12.6	NA	36	70
Days running	19	NA	10	21	NA	9	8
Data Hours per day	11	NA	12	10	NA	9	10
Fill Length (min)	10	NA	20	60	NA	30	60
Good Event Rate (Hz)	7	NA	30	17	NA	100	190
Max DAQ Rate (Hz)	80	NA	140	1000	NA	500	1200
Performance in BES-II (**achieved**)	2019	2020	2020	2019	2021	2019	2018
Required Number of Events	100	160	230	300	250	400	NA
Achieved Number of Events	2.9	160	**235**	**324**	TBD	**582**	**560**
fill length (min)	20-45	**45**	**25**	**45**	50	**60**	**120**
Good Event Rate (Hz)	20-25	**36**	**80**	**170**	265	**400**	**620**
Max DAQ rate (Hz)	400	**700**	**550**	**800**	1300	**1800**	**2200**
Data Hours per day	12-15	**15**	**13**	**9**	15	**10**	**9**
weeks to reach goals	16-10	**12.0**	**8.9**	**8.6**	2.5	**5.3**	**4.0**

Methodology 1: performance improvement

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Expected factor of 3 improvement at lowest energies and factor of 3.5 at highest energies

Energy	7.7	9.2	11.5	14.6	17.1	19.6	27
Predicted	21	NA	90	(51)	NA	350	665
Achieved	---	36	80	170	---	400	620

Prediction ➔ 21 +/- 5

Methodology 2: gamma scaling

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Collision Energy (GeV)	7.7	9.2	11.5	14.6	17.1	19.6	27
Performance in BES-I	2010	NA	2010	2014	NA	2011	2011
Good Events (M)	4.3	NA	11.7	12.6	NA	36	70
Days running	19	NA	10	21	NA	9	8
Data Hours per day	11	NA	12	10	NA	9	10
Fill Length (min)	10	NA	20	60	NA	30	60
Good Event Rate (Hz)	7	NA	30	17	NA	100	190
Max DAQ Rate (Hz)	80	NA	140	1000	NA	500	1200
Performance in BES-II (**achieved**)	2019	2020	2020	2019	2021	2019	2018
Required Number of Events	100	160	230	300	250	400	NA
Achieved Number of Events	2.9	160	**235**	**324**	TBD	**582**	**560**
fill length (min)	20-45	**45**	**25**	**45**	50	**60**	**120**
Good Event Rate (Hz)	20-25	**36**	**80**	**170**	265	**400**	**620**
Max DAQ rate (Hz)	400	**700**	**550**	**800**	1300	**1800**	**2200**
Data Hours per day	12-15	**15**	**13**	**9**	15	**10**	**9**
weeks to reach goals	16-10	**12.0**	**8.9**	**8.6**	2.5	**5.3**	**4.0**

Above 19.6, performance scales as γ^2, below 19.6 performance scales at γ^3.

Energy	7.7	9.2	11.5	14.6	17.1	19.6	27
Predicted	21	39	83	165	265	450	NA
Achieved	---	36	80	170	---	400	620

Prediction ➔ 21 +/- 5

Predictions:

Fill length ➔ 20-45 minutes (we used 10 in 2010, cooling will increase this)

Hours per day ➔ We have achieved 15 hours for periods in which we are not time sharing, however if we really have 20 minute fills estimating only 12 hours per day would be more accurate.

Good events rate ➔ My two methodologies suggest that 21 is the most likely outcome. So far we got 2.9 Hz in 2019 without cooling and without optimization. I picked a range from 20-25, maybe that is overly optimistic, but I understand that cooling should work best at 7.7 GeV.

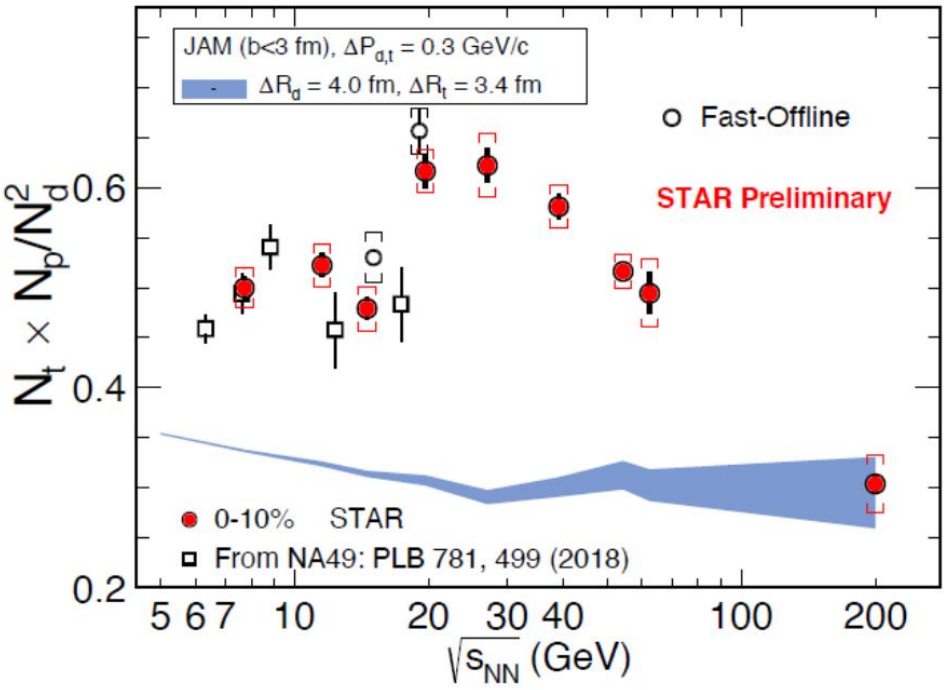
Optimistic prediction ➔ 15 hdp X 3600 X 25 Hz = 1.35 M/day ➔ **10.6 Weeks**

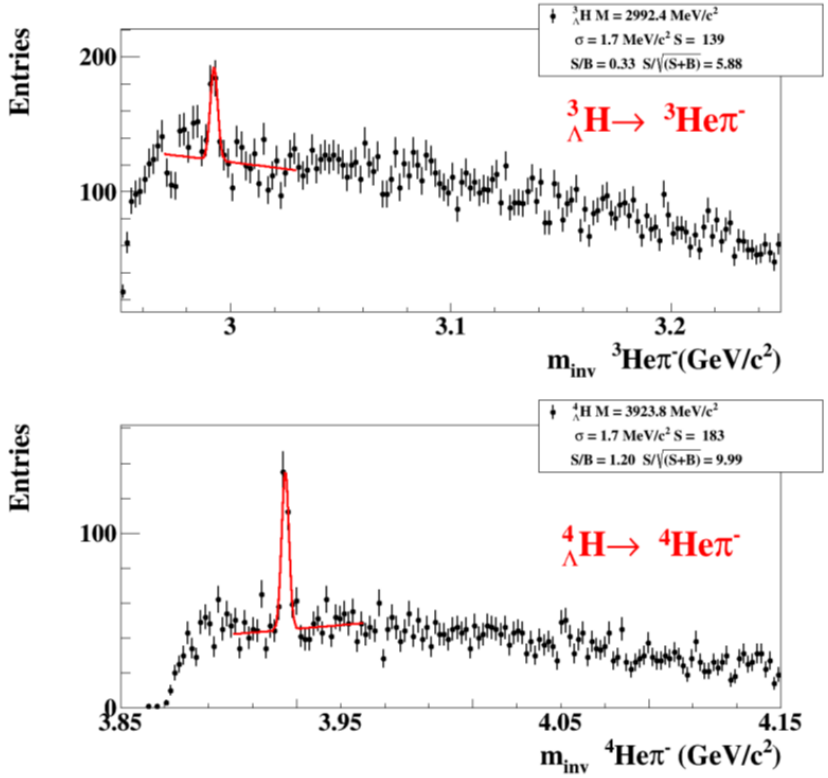
Pessimistic prediction ➔ 12 hpd X 3600 X 20 Hz = 0.86 M/day ➔ **16.5 Weeks**

LFS Highlights

First --- Two highlights which should be included in the proposal section:

- Light nuclei ratios – Supports the need for 17.1 GeV
- Hypernuclei – Supports the additional low energy FXT runs





Dileptons in Au+Au collisions at $\sqrt{s_{NN}}$ = 27 and 54 GeV

Zaochen Ye (Rice) and Zhen Wang (CCNU)

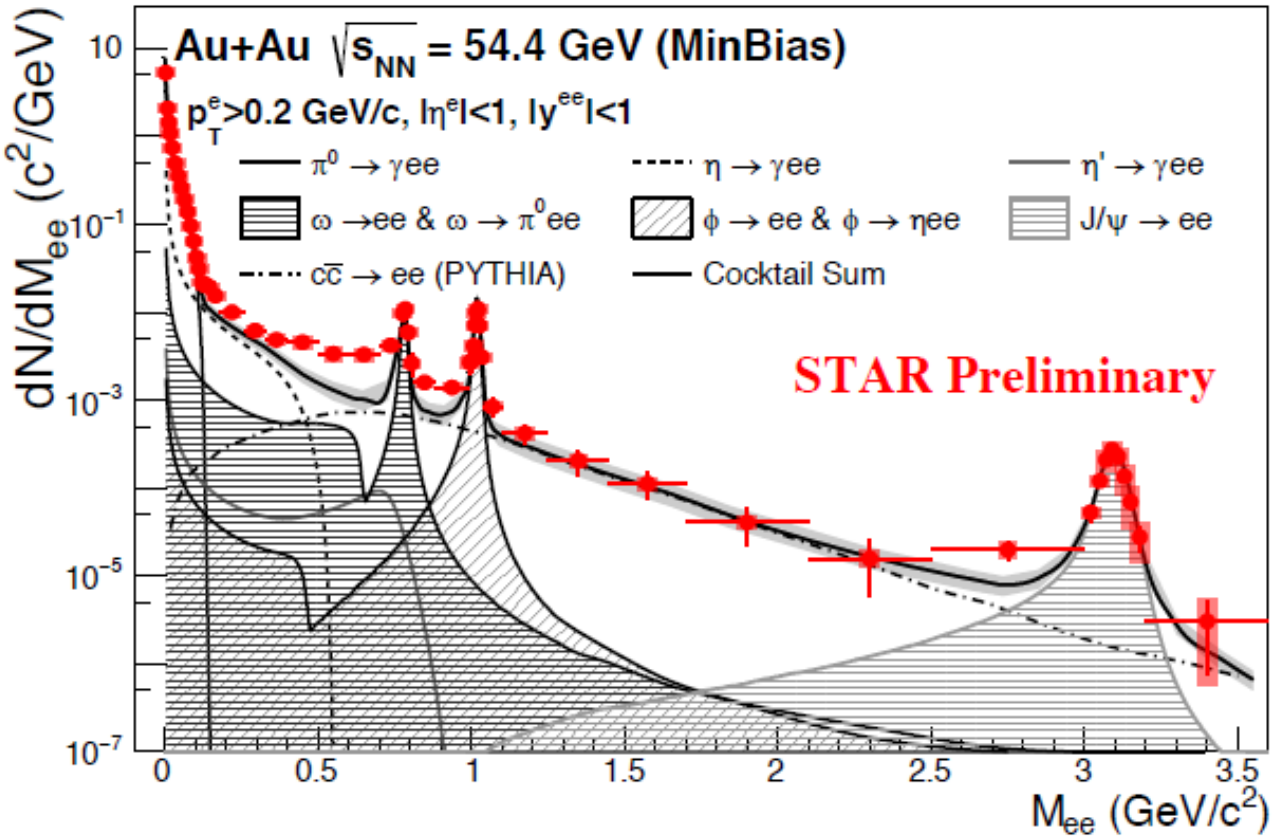
What is new?

54 GeV is new energy

Centrality and pT dependence

Presented at HP2020

Paper proposal later



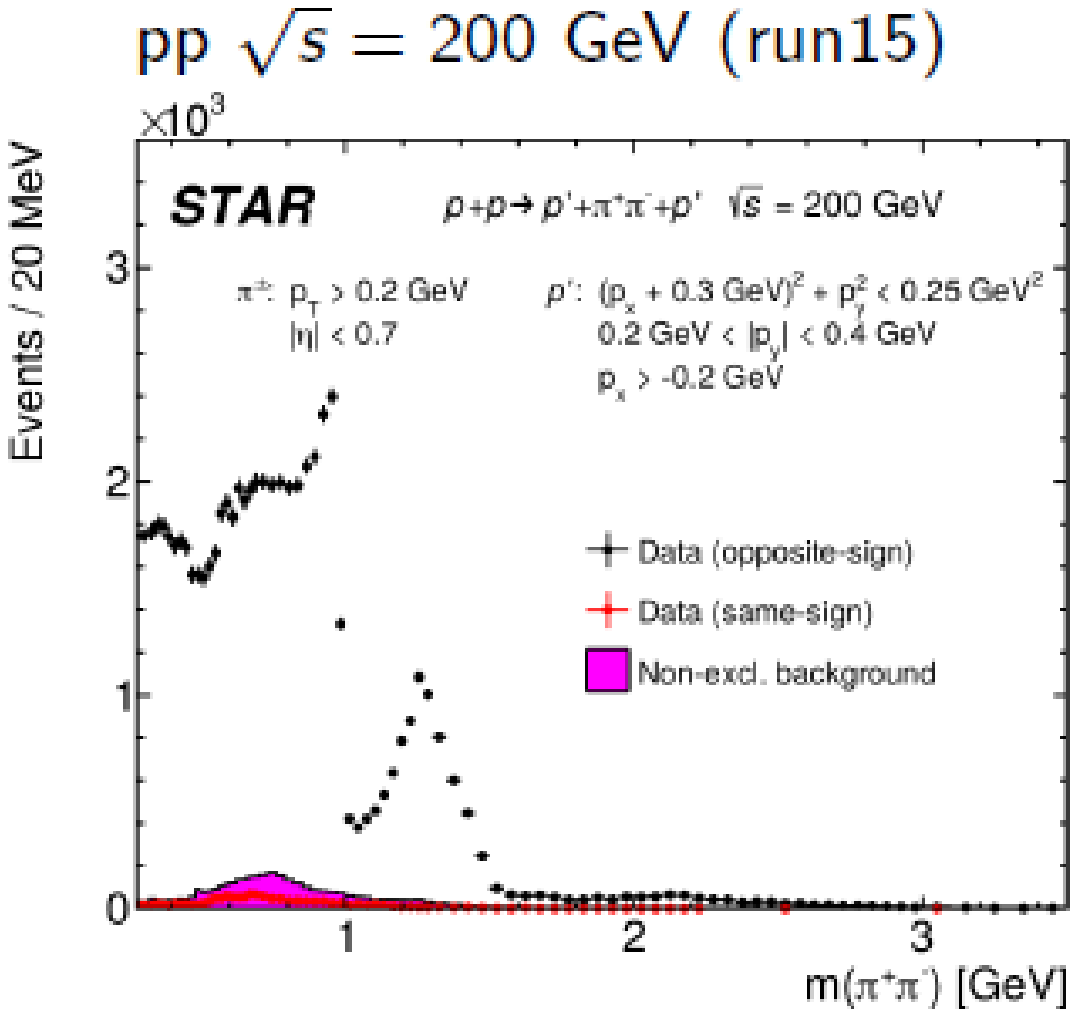
Central Exclusive Production p+p collisions at $\sqrt{s_{NN}}$ = 510 GeV

Tomas Truhlar (CTU)

What is new?
First Result

Status:
Preliminary results for
π+π-
K+K-
p-pBar

Expected:
ICHEP talk in September



Strangeness in Au+Au collisions at FXT energies

Yue-Hang Leung (LBNL), Jakub Kubat (CTU), Iouri Vassilev (Frankfurt/GSI), Usman Ashraf (CCNU), Guannan Xie (LBNL)

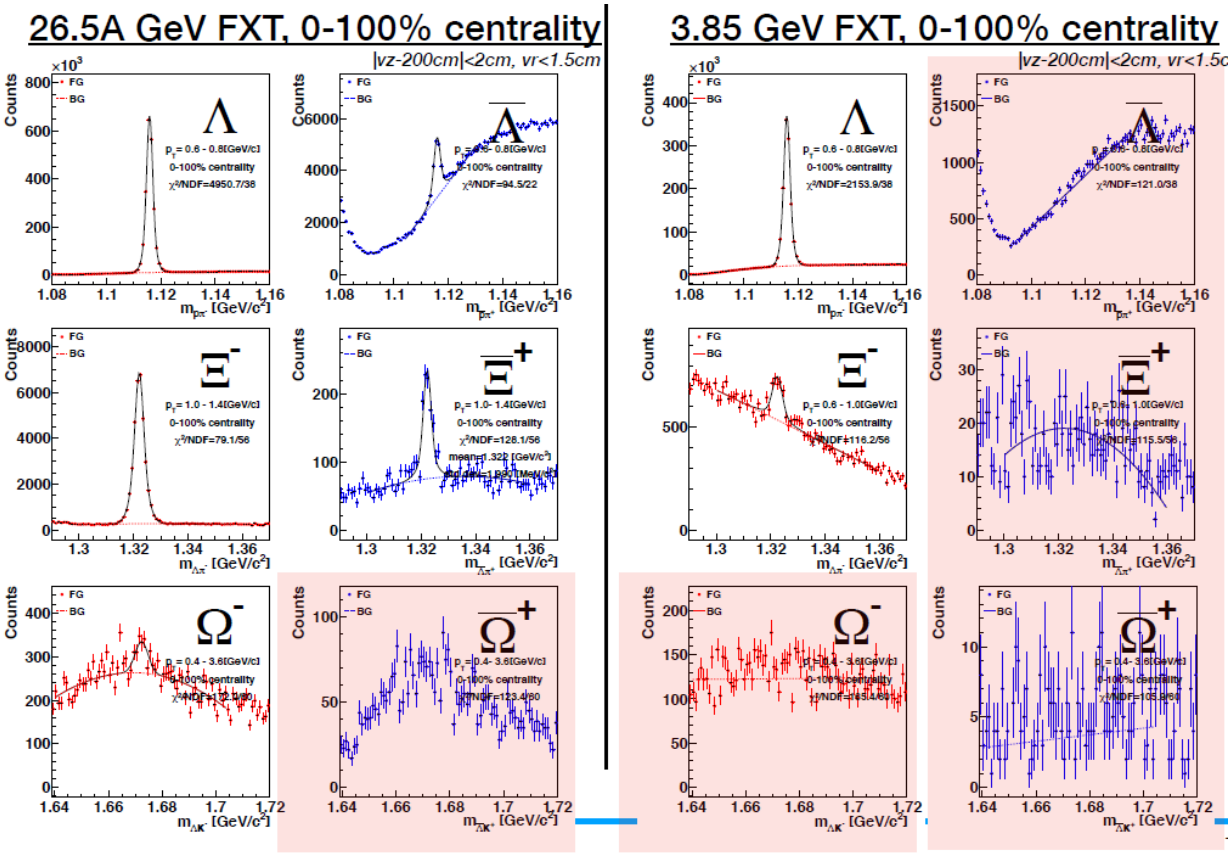
What is new?

First results for Ξ and ϕ at 3.0 GeV

New energies for other results

Expected:

Phi results need embedding but otherwise ready for paper proposal



$\pi^{\pm}$, $K^{\pm}$, p and p-bar in Au+Au collisions at $\sqrt{s_{NN}}$ = 27 GeV

Matt Harasty (UC Davis)

What is new?

Rapidity dependence

Status:

Raw Spectra – Done

Embedding – Done-ish

Corrections – Done

Needed:

None

Expected:

Paper Preview soon