

Overview and Status of BRAHMS

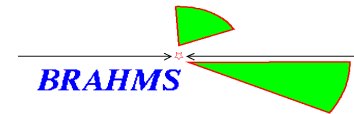
BNL

December 6-9

F. Videbæk

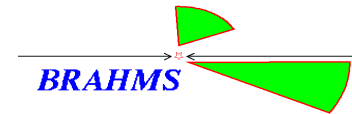
Physics Department

Brookhaven National Laboratory



Overview

- RHIC status & schedule.
- Physics Plan for RUN-3
- Preparations for run-3
 - Repairs, Upgrades
 - Shifts organization
- Analysis.
 - Quality, production running
 - Physics results
- Publications, talks
- Collaboration issues
 - Communication
 - Future



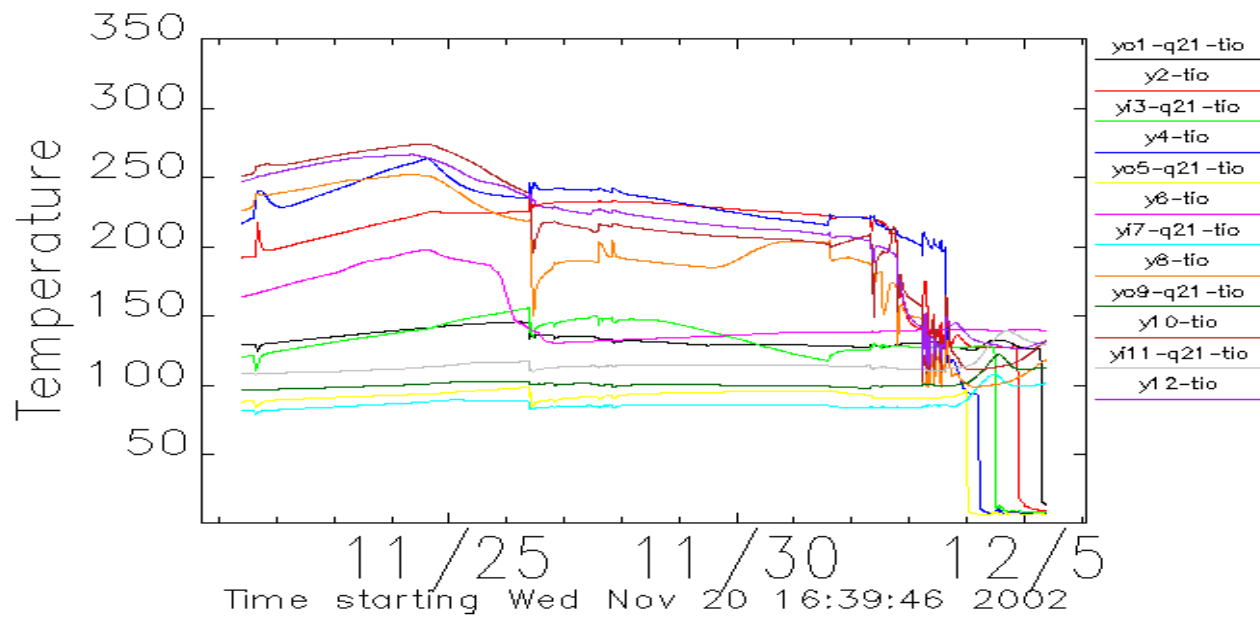
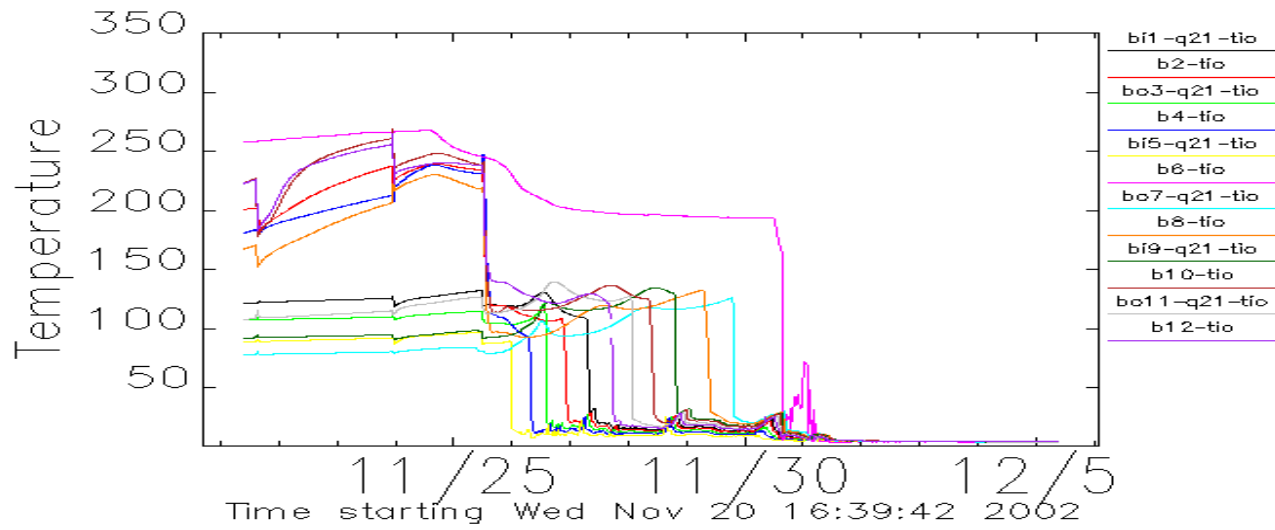
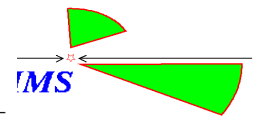
RHIC status – Beam Schedule

RHIC cool down is underway and progressing reasonable well.

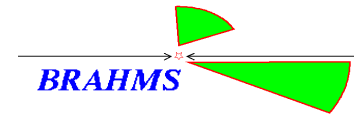
In particular the time set aside for beam setup (2 weeks) and beam+detector commissioning (3 weeks) is only an estimate. It could take short or longer.

For up to date information please checkout the scheduling physicist web-page at <http://www.agsrhichome.bnl.gov/AP/RHIC2001/SchedPhys/>

- Dec 3 Blue (D) Cold; Dec 9 expected yellow (Au)
- Dec 4 d setup started injection into blue.
- Dec 18 d Au beam + detector commissioning
- Jan 3 d Au physics starts I.e data taking, not detector setup. At this point the luminosity should be stable, and priority given over to production running. Realistic ? Wait and see.
- Mar 20 end dAu one week of background studies Au in Blue ring
- Mar 26 pp setup
- Apr 10 pp and detector commissioning
- Apr 28 pp physics run
- May 18 end of RHIC run-3



RHIC Run Periods

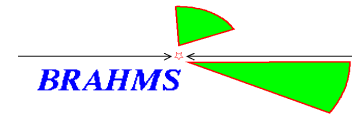


- **RHIC Run Plan.**

- Pending Congressional funding . The DOE and RHIC/BNL is still on a continuing resolution, where spending is allowed at last years actual funding. The presidents budget calls for 29 weeks cryogenic operations (4 weeks cool down- 1 week warm up) which is used for the run-plans discussed. It may be that actual funding does not come until March? It may be reduced !

- **Expected Machine performance**

- CA-D takes a conservative approach to the upcoming run.
- Setup time 2 weeks + 3 weeks to reach (minimal goal).
- Presently transferred both d and Au into arc at injection energy. So far the achieved beam goals are **below** the maximum expectations given at last years retreat by a large factor. (see next page).
- At ATR so far achieved: 33(d) and (0.3) Au (in 10^{*9}).
 - Source output from tandem; large emittance.
 - CA-D is planning to improve by source tuning, bunch intensity doubling by filling in booster-AGS.
 - Au should be able to reach 0.7, which were achived in 2001.



Expected Luminosities

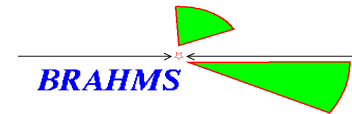
At the RHIC retreat T.Roser presented minimum and maximum expected average weekly luminosities.

*achieved in 2001

Our request for d-Au was for 15 (nb)⁻¹.

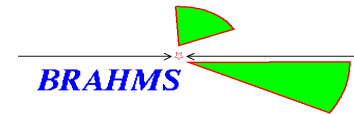
Mode	bunches	Ions per bunch	L(ave)/wk	Integral
p p*	56(112)	70 x (10**9)	0.3 (pb)⁻¹	10(pb)⁻¹
d Au	56	80(d) 1 (au)	4 (nb)⁻¹	44 (nb)⁻¹
d Au	56	20(d)0.7(au)	0.7 (nb)⁻¹	8 (nb)⁻¹

Physics Plan for Run-3



In the Rhic Beam Use Proposal we requested $\sim 15 \text{ nb}^{-1}$ of dA for

- $\sim 4 \text{ nb}^{-1}$ for survey
- $\sim 12 \text{ nb}^{-1}$ for high(er) pt measurements at $Y \sim 2,3$.
- The physics issue is really to get a baseline p(d)A to be used with next years high statistics Au-Au running
- There are two issues we should discuss at this meeting
 - Strategic planning of run that is the overall order of goals to achieve; distinguish from the day-to-day actual running.
 - What physics goals to set if the luminosity does not get above $\sim 30\%$ of desired
- The minimum of $\sim 0.7 \text{ nb}^{-1}$ per week (7 nb^{-1} total) is \sim factor 2 down. Survey could be completed, but this is not the trust of the dA program. Focusing on high p_t alone is not viable either.
- Wait and see if higher luminosity will not be result of next 2+3 weeks, but we should be prepared to follow-up if the luminosity is still low.
- We will return to this issue in presentations of triggers, and run-discussions.

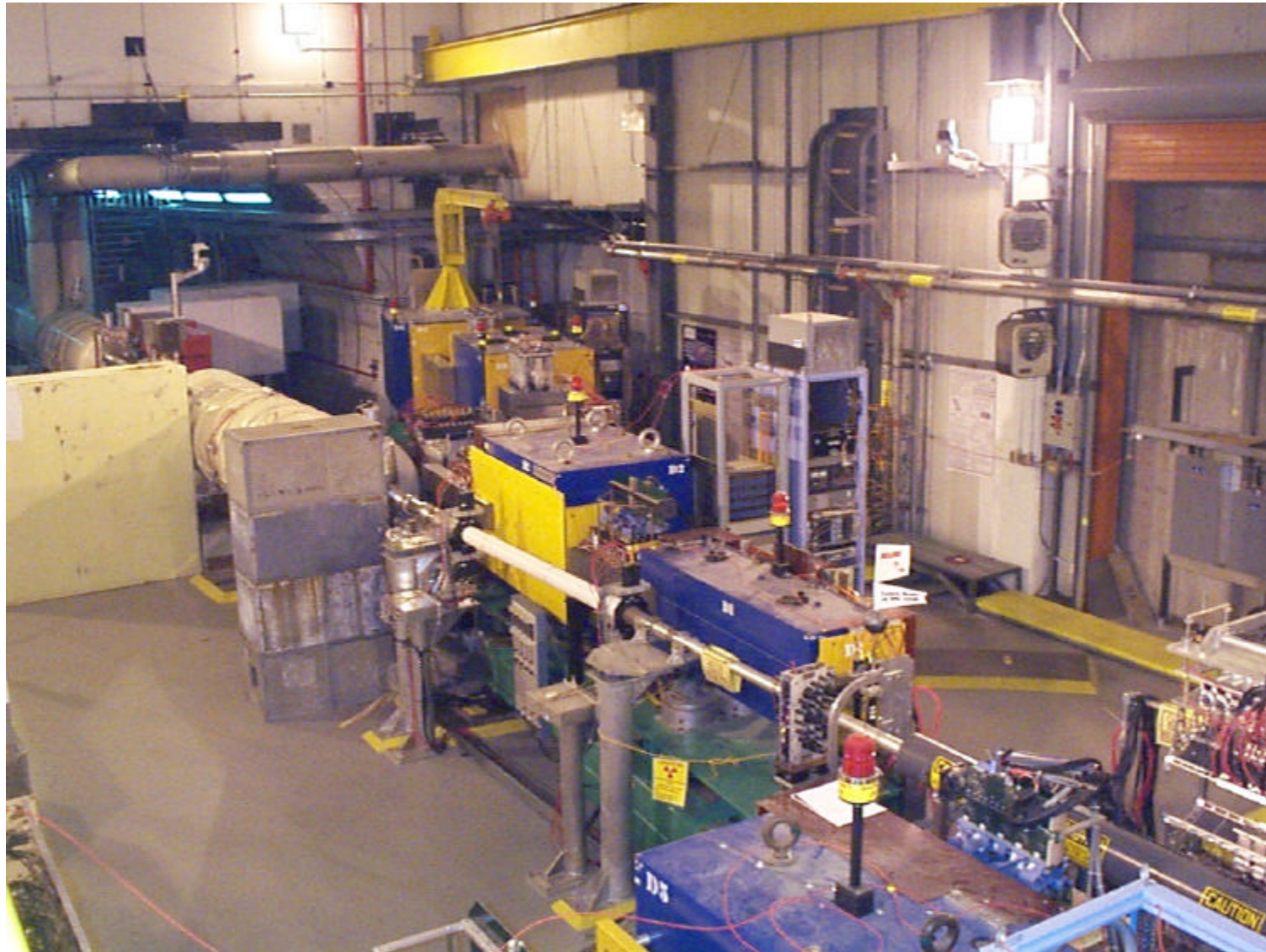
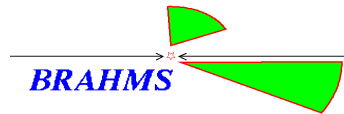


Repairs.

Complete Upgrades, Repairs

- DC – HV distributions T3,T4,T5
 - Additional HV supplies (no 1471P spares)
 - Updated documentation from Krakow
- Si – wafer replacement purchased, and in hand.
 - Installation for d-Au and pp to be considered (SJS -> keep old si for dA and pp run).
- TPC gas flow/fields. Large non-linear effect on X,Y vs. pad time.
 - All chambers foils replaced by Al.
 - Drift velocities in/out very consistent. (RD)
- Calibration fibers
 - Reinstalled + one new set. (MRS).
- Magnet fields, calibrations relative to Hall probe.
- Shielding for BFS detectors.
 - Complete shielding installed in IR for BFS
 - Additional shielding installed; moveable (see slide)
- ZDC tubes replaced

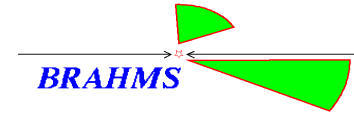
New look in IR –shielding of BFS...



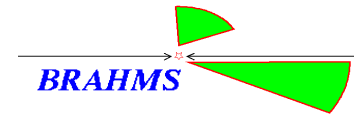
December 6-9,2002

Brahms Collaboration Meeting

New Detectors components

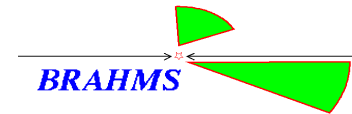


- High p_t Cherenkov
 - Aim for run-3 pions 2.5 - 6 GeV/c – next year where we have a window of opportunity. This also mean large fraction of the physics program for MRS is dedicated.Requires substantial Luminosity.
 - We will discuss this later – earliest installment mid to end January.
- Trigger counters for FS and MRS
 - These are a must for dA and pp running.
 - FS ready, MRS to be installed within 1-2 weeks
- Min Bias and vertex trigger
 - Still in state of flux – see later.



Shift activity.

- Period coordinator
 - Responsibilities
 - Coordinate shifts, daily checkout, first contact for problems.
 - Period of coverage
 - At least 2 weeks, best 3-4 weeks
 - I like the idea, but no-one has followed up on this so far and agreed to acts as such even for limited periods.
- Shift people
 - Responsibility
 - Execute run plan; monitor quality of data; report problems
 - Training
 - Radworker ie TLD training not required for shift leader
 - Both formal CA-D, but also knowledge of Brahms setup, operational procedures.
 - **New Access requirements to BNL, particular for non- US citizens. Enough has been said in e-mail; be sure to follow rules. Prepare at least 1-2 month ahead with IA-473 approval and visa if needed.**
- Institutional Responsibility
 - Supply shifts people even for unpopular period and in fair share model.
 - Layout a fairly complete plan for the total run I.e. now through May.

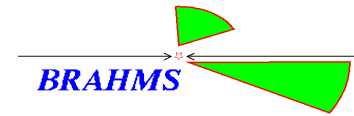


Preliminary commitments.

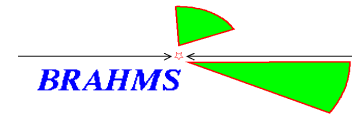
- Will come back to this later today
- Preliminary ‘commitments/expectations’ so far
- Needs
 - 650 shifts to be covered (Jan 1 – May 15)
 - Initial commissioning of detectors, triggers. (~20 shifts)
 - Initial commissioning of monitoring software.
 - Preliminary allocation based on information so far from coll. Inst.

inst	Shift active	Allocation	Current commitment
BNL	6	116	120
TAMU	3	58	53
JH	1	20	26
NYU	1	20	10
UK	2	39	9
Krakow	4	77	51
Oslo/Bergen	6.5	140	34
NBI	6	116	24
Bucharest	5	80	125
IRES	1	20	10

RHIC scheduling



- Weekly Scheduling
 - Monday Scheduling meeting (decisions) for **weekly** activities, access, beam exp beam developments (1.30)
 - Tuesday – time meeting (**broadcast**)
 - Wednesday – experiment meeting (**experiment progress**) (Kirk and exp.)
- Daily 8.30 status/update
 - With the more firm schedule above these hopefully needs less input from experiment, but changes in plans due to problems specific needs will be addressed here.
- Access to IR during run
 - During ramp-up one weekly scheduled (Wed or Thursday) up to 8 hour experiment access.
 - During physics running 1 such every 2 weeks.
 - Switchover to
- Beam experiments
 - Acc physicist will have one 12 hours period for beam exp. At end of such study/exp.accelerator should be ready for standard setup and ramp. Not to start until



Analysis

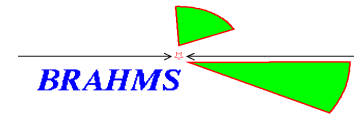
- Data collected
 - Au-Au at 200GeV primarily 0-25% central collisions.
 - pp 200 GeV. Spectrometer triggered data MRS, FFS and BFS
- Quality and statistics
 - Au-Au is turning out to be fairly complete
 - pp has many holes in coverage due to short run and setup problems.

Analysis Goals

Large aim was to produce first rapidity distributions for QM02 and for the 200 GeV rapidity ratio letter.

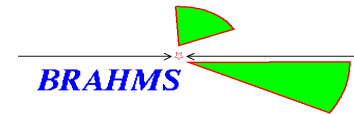
See a set of specific analysis goals and papers from 01 run.

- Proton distributions and stopping
- Produced particles K,pi rapidity dependence
- Centrality dependence (at least at $y \sim 0$)
- High pt analysis $y \sim 0, 1, 2$
- Pp particle spectra.
- Will also hear on Lambda's..



Towards these Goals

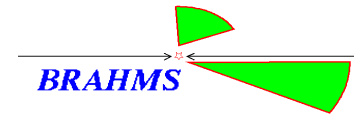
- In addition to overall goals of
 - PID, efficiencies, common dst, acceptance code
- Establish sub-groups from different inst that works on specific analysis and communicates at regular intervals on programs.
 - Example: pp analysis in TAMU & Oslo.
- The aim is to mature the analysis, document it in form of analysis notes, proceeding to publication writing.



Talks, Publications

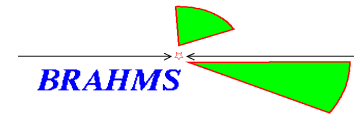
- The year since last collaboration meeting has been productive
- Publication in refereed journals
 - Multiplicity 200 PRL
 - 200 GeV Rapidity dependent ratios. Submitted in July; resubmitted ~3 weeks ago.
 - NIM RHIC volume on its way to print. In hand by publishers by now. T.Ludlam has writing an brief overview.
- Talks at International meeting with proceedings
 - QM 02 Nantes, IG.Bearden, JH.Lee, D.Ouerdane, C.Ekman
 - ICHEP Amsterdam, Dieter
 - PANIC Osaka. P.Christiansen, H. Ito, J.I.Jordre

Collaboration Issues



- Communication
 - Local meetings
 - Area meetings
 - Analysis Notes
 - A good number of notes as well as web postings on analysis has been made.
 - On all of these I think we can do better. It is very important since the collaboration is widely distributed. It takes a while to write a note but it does also help in clarifying what is done.
 - Abstracts, proceedings.
- Brahms and the community
 - Getting talks at meetings.
 - Active participation in workshops.
- Future engagements
 - Program after baseline
 - RHIC R&D.
 - RHIC II – as a collaboration such engagement is not viable. (5-10 year horizon);
The funding agencies also see this route as an incremental pursuit for detectors.

Future Engagements



BRAHMS baseline program

The basic program (au-Au, Si-Si, pA and pp) at max RHIC energy can be completed during the RUN-3 and RUN-4.

At least Bergen/Oslo and NBI has commitments to LHC that means ceasing active participation in additional runs/ plans. (after Run-4)

After about Run-4 the size of Collaboration is too small to run a full scale RHIC program.

Can **RHIC** deliver both Au-Au and Light Ion beam during 04 run in view of the steady commitment to pp running?

IS there enough interest and commitments of people to run a aa program in fy05?

Upgrades for Run-4

If the earlier proposed physics addition to Brahms in this run has to be possible a real commitments has to be made.

- PHOS as discussed last May
- SDD (simulated by BS) but no real follow-up

Discussion on future – possibilities

Informal discussions have started with with groups in Phobos for joint new scope 'small' experiment

Focus on specific short term opportunities e.g in spin physics, or special HI ideas.