

Update from the DOE Program Manager for Heavy Ions

BNL/AGS Users Group Meeting

Aug. 3, 2023

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U.S. DEPARTMENT OF
ENERGY

Office of
Science

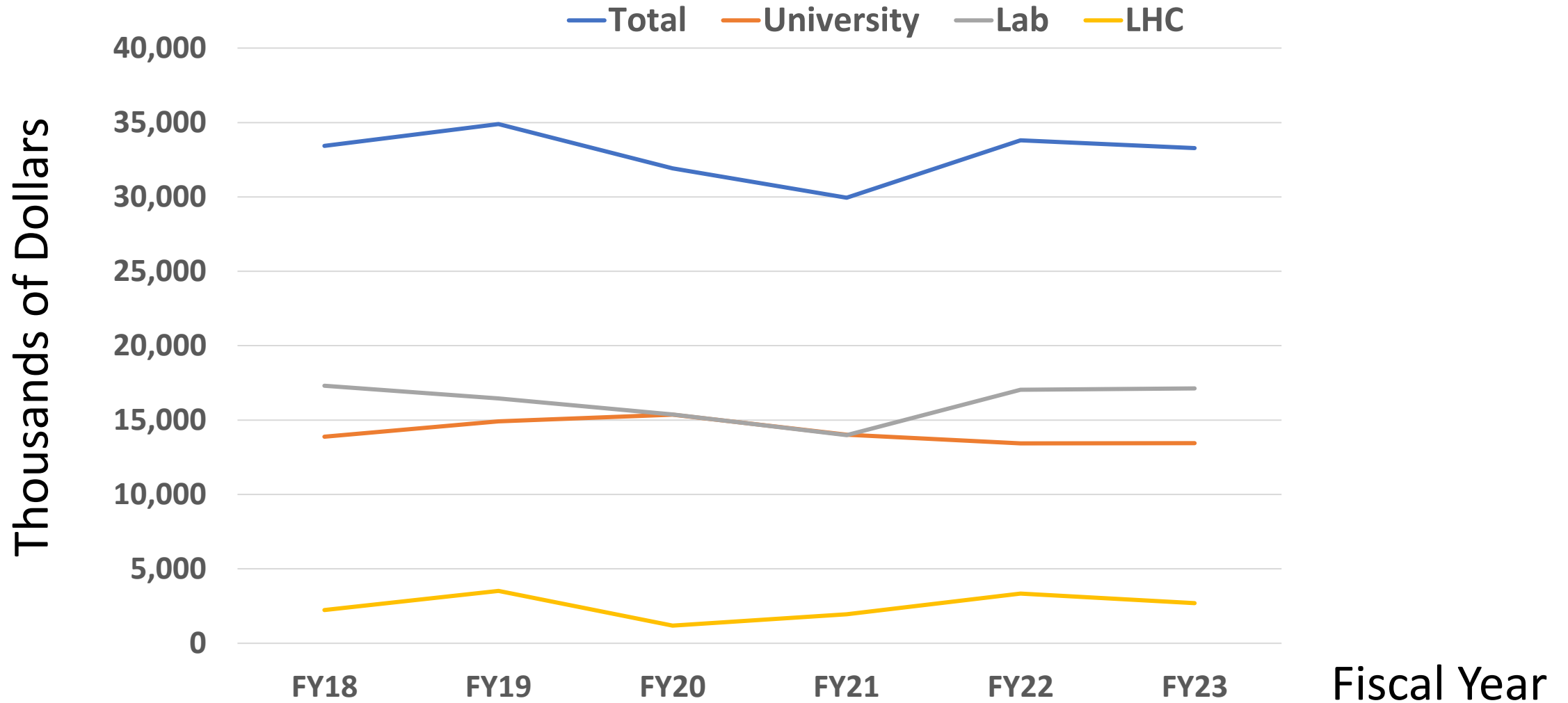
Outline

- Heavy Ion Research Budget
 - Short review
 - Future outlook
- Comparative Review Process
 - Now done every year for university proposals
 - Balance of Lab/university/LHC funding
- Heavy Ion program: Highlights submitted to NP
 - Note: these are submitted by the community (not me!)

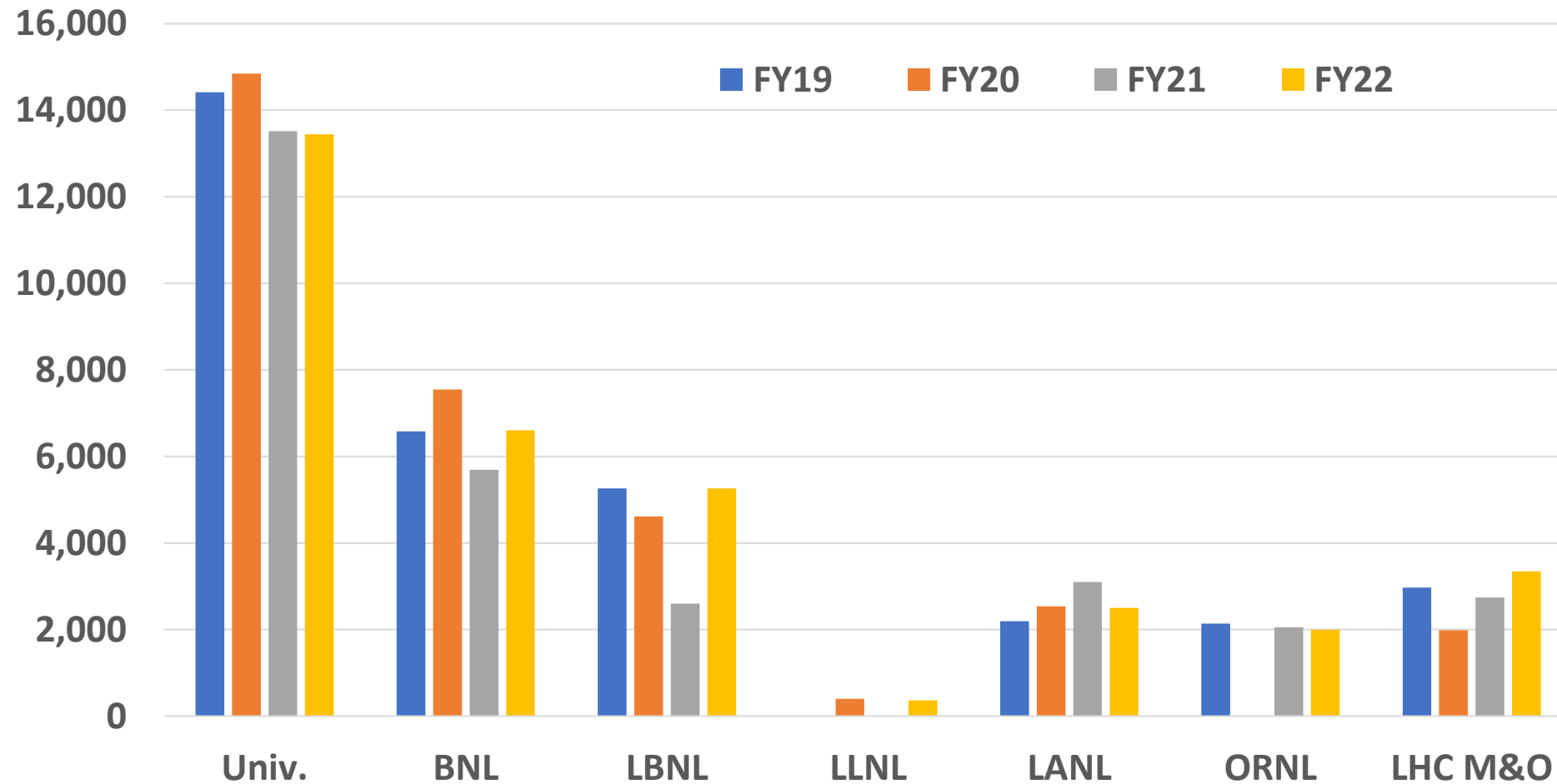
Budget: short remarks

- Take-away message:
 - Research budgets at DOE have been flat and are likely to remain flat
 - Rough ratios are Lab:University:LHC = 50:40:10
- By “flat” I mean “constant dollars”
 - With inflation: effectively this means a “cut”
- LHC costs are uncontrolled
 - LHC charges Maintenance and Operations (M&O) for each PhD user
 - LHC computing needs increase yearly
 - Charges are in Swiss Francs

Funding History: Heavy Ion Program



Breakdown by year: HI Lab funding



Future Outlook

- Tim Hallman already covered the overall NP budget
 - EIC construction and facility operations are prioritized
- The Heavy Ion research budget will likely remain flat.
 - The community always has good ideas for expansion!
 - We will continue to make the hard choices necessary to balance the budget.

Comparative Reviews: procedures

- For **all renewal (and new) proposals** submitted to the Heavy Ion program in a given year:
 - **Two levels of review:** “mail-in” (individual) review + panel review
 - Previously, only the “mail-in” reviews were done
- **Panel review:**
 - All proposals are ranked by the panel
 - The panel reads the (anonymous) mail-in reviews
 - Each proposal is discussed by the panel
 - The proposals ranked the lowest will not be funded
- **Deadline for proposal submission: Nov. 15**

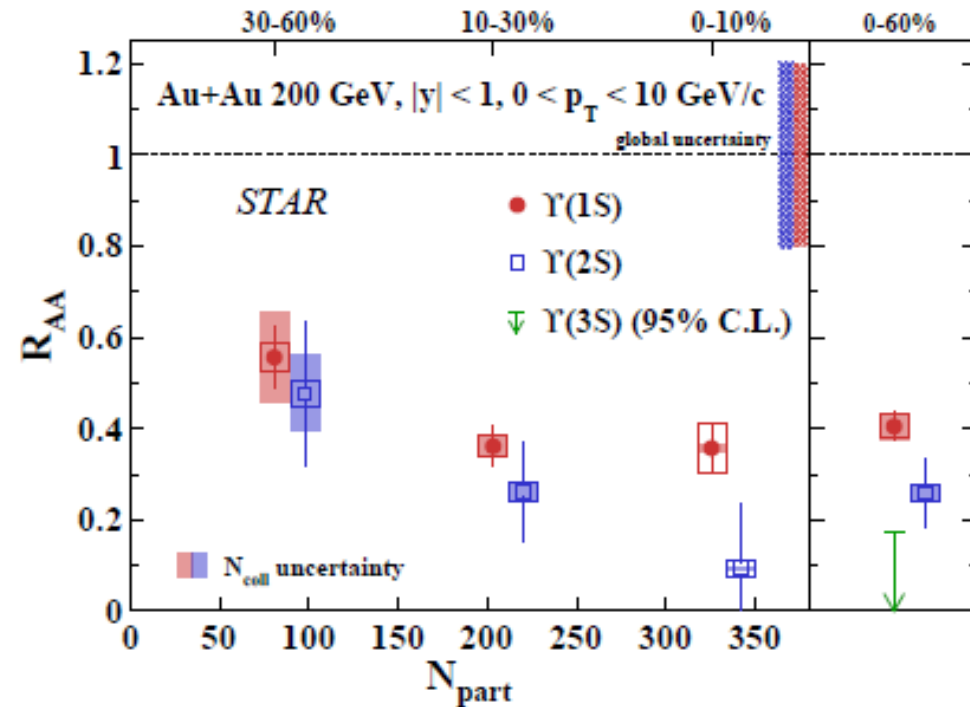
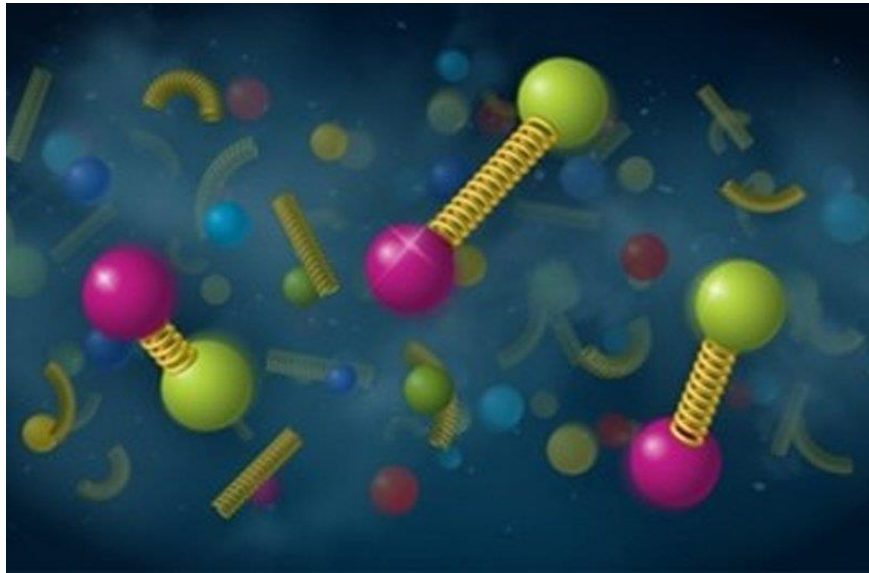
Comparative reviews: rationale

- Individual (mail-in) reviewers see only one (or a few) proposal(s)
 - The reviewer gives a score (excellent, very good, good, etc.)
 - How is the score decided? Each reviewer has their own comparison scale!
 - There is a tendency to give high scores (“happy talk”)
- Panel reviews compare all proposals at once
 - Panelists are forced to give a rank ordering of all proposals
 - Panelists have a chance to ask questions during discussion
 - Panel reviews have been done by other agencies for years

Panel results for last year (FY2023)

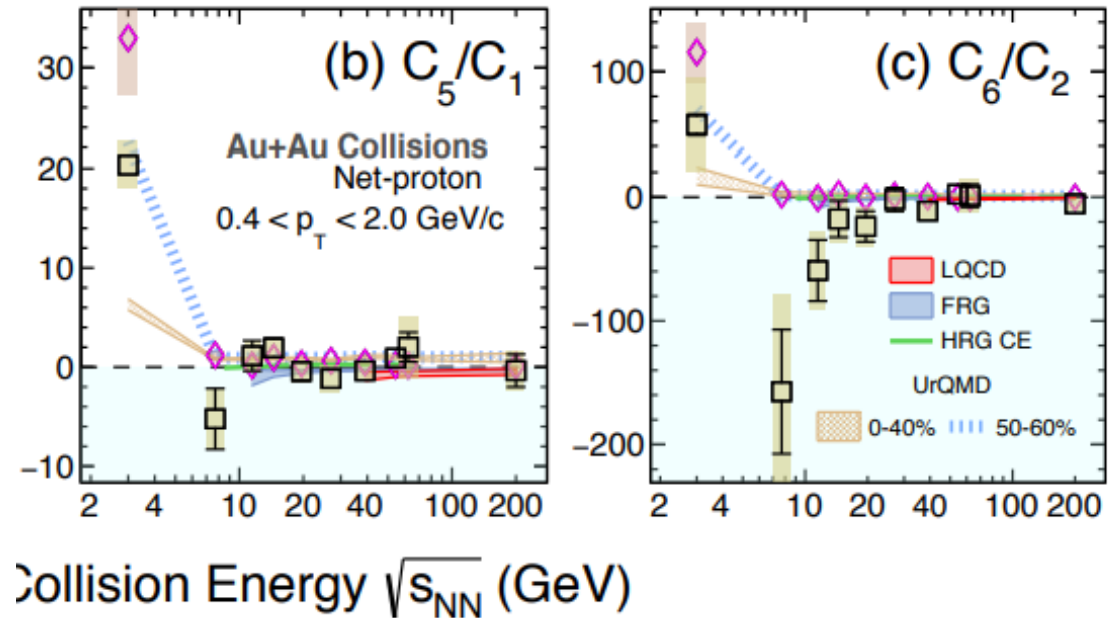
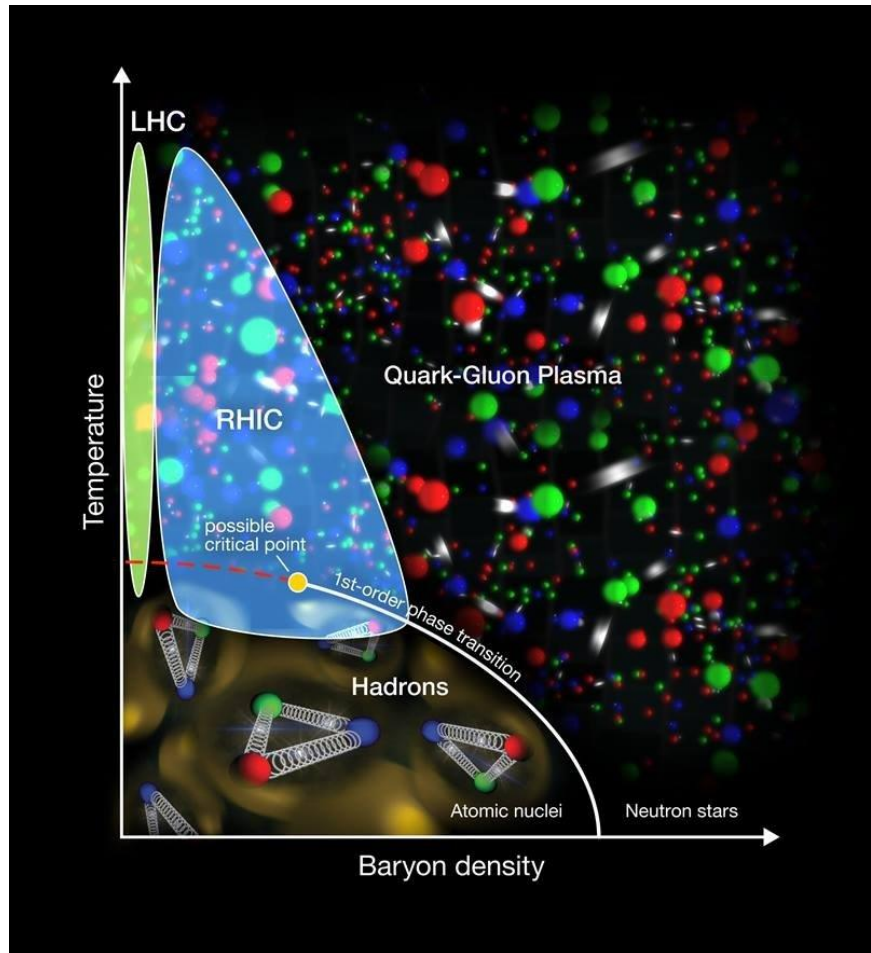
- Total of 12 proposals (11 renewals) submitted
 - Two proposals (at the bottom) were not funded
 - One proposal (lower rank) received much reduced funding
- All other renewal proposals were held flat
 - Many proposals requested increased budgets
 - The DOE Heavy Ion budget was flat
- The quality of proposals is generally very high.
 - Lots of high-quality papers published
 - Lots of new ideas for future work
 - Lots of hardware development/commissioning (EIC, sPHENIX, etc.)

STAR Physicists Track Sequential ‘Melting’ of Upsilon States (posted: 6/15/2023) *Physical Review Letters* **130**, 112301 (2023)



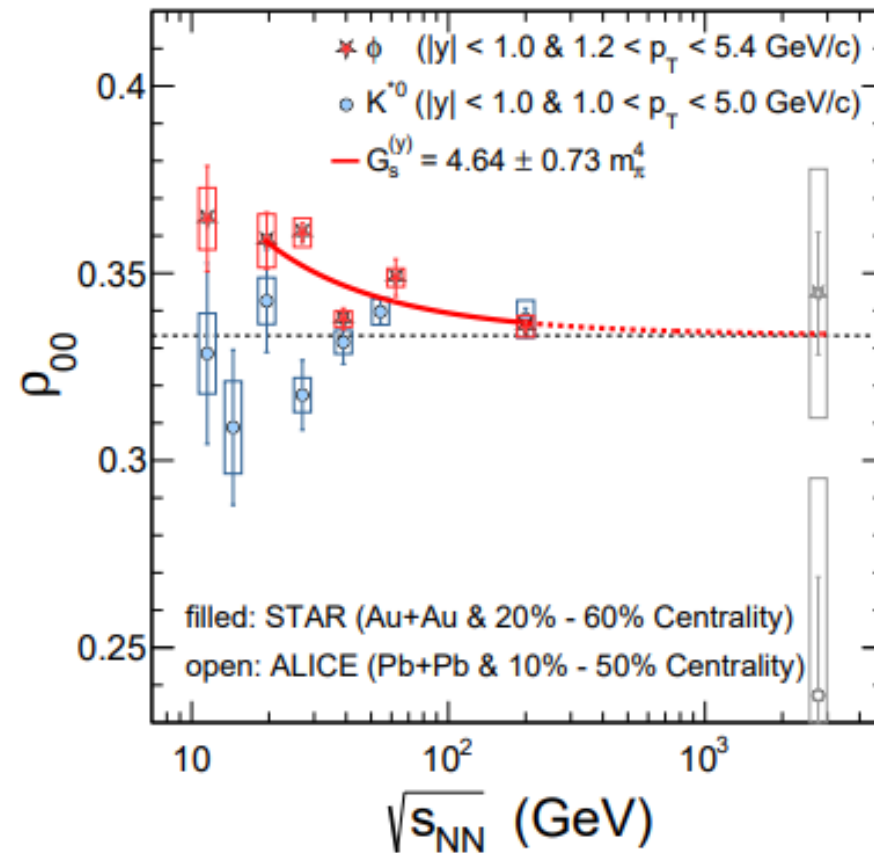
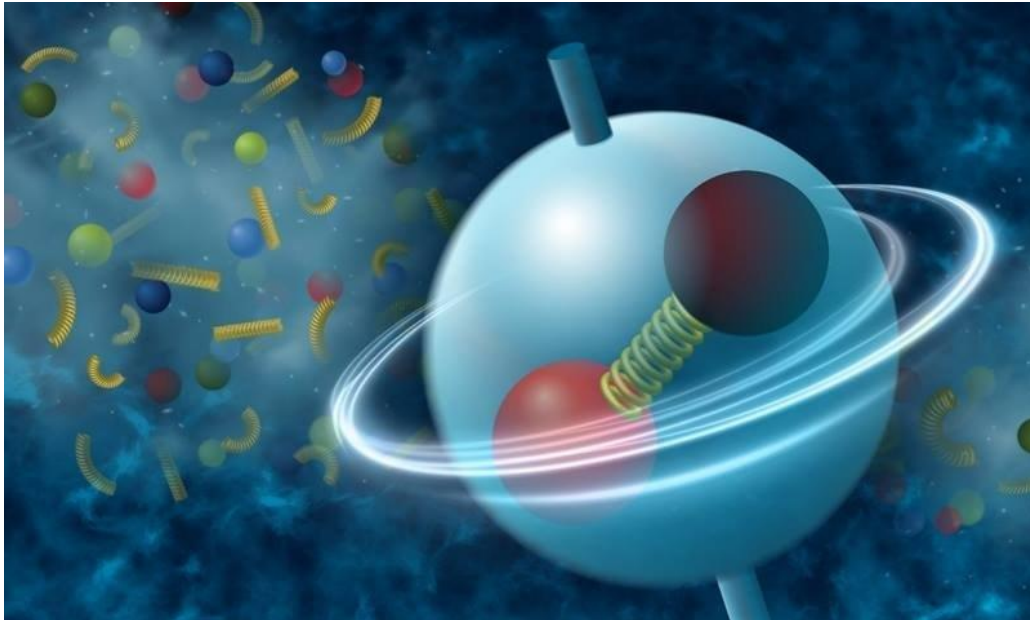
“The RHIC results show the **expected pattern for the two most tightly bound Υ states** and, with low precision, the possibility of no signal for the most loosely bound state—which would imply that the latter might have been completely dissociated in the plasma.”

A Low-Energy ‘Off Switch’ for Quark-Gluon Plasma (posted: 6/5/2023) *Physical Review Letters* **130**, 082301 (2023)



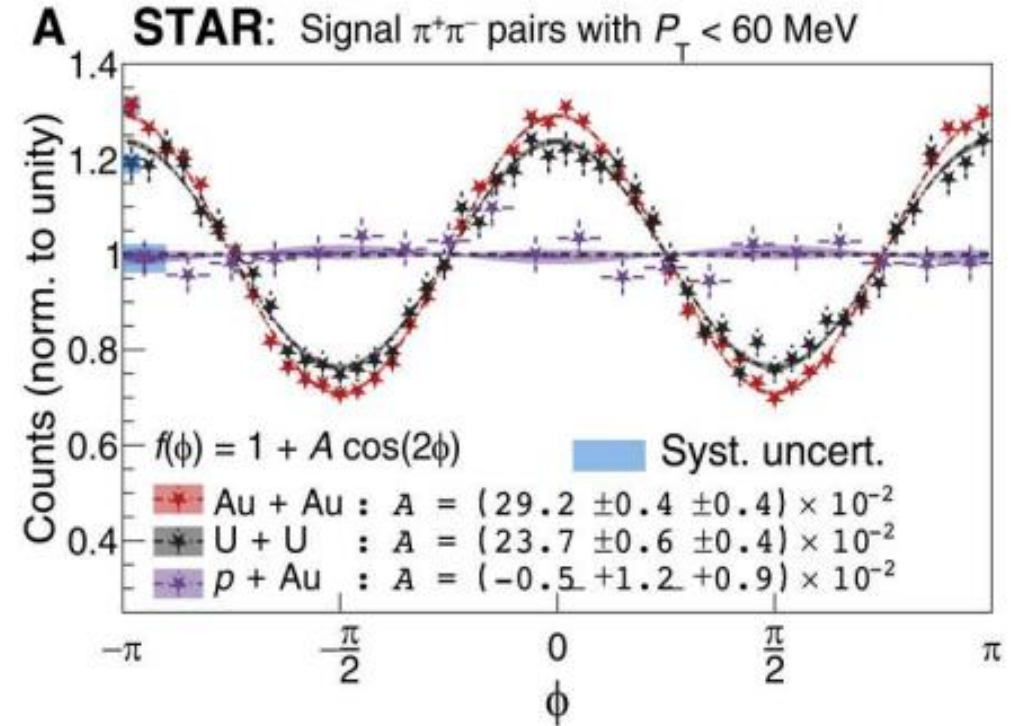
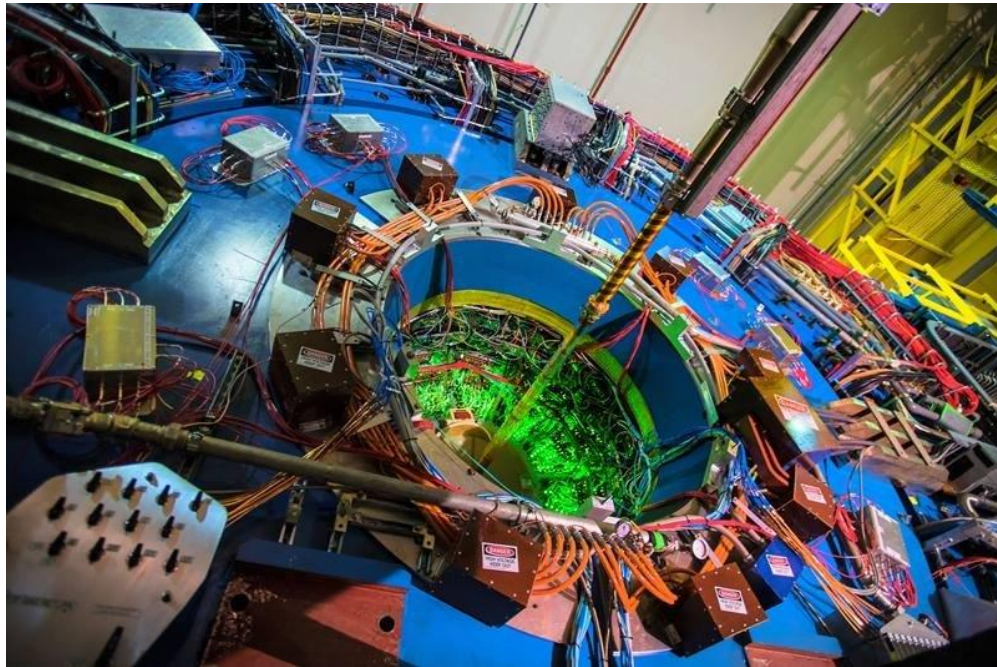
“at the lowest energy, 3 GeV, the scientists saw a dramatic shift. The order of the hierarchy among the analyzed characteristics flipped—and so did the sign of the key relationships, from negative to positive.”

Surprising Preference in Particle Spin Alignment (posted: 5/5/2023) *Nature* **614**, 244–248 (2023)



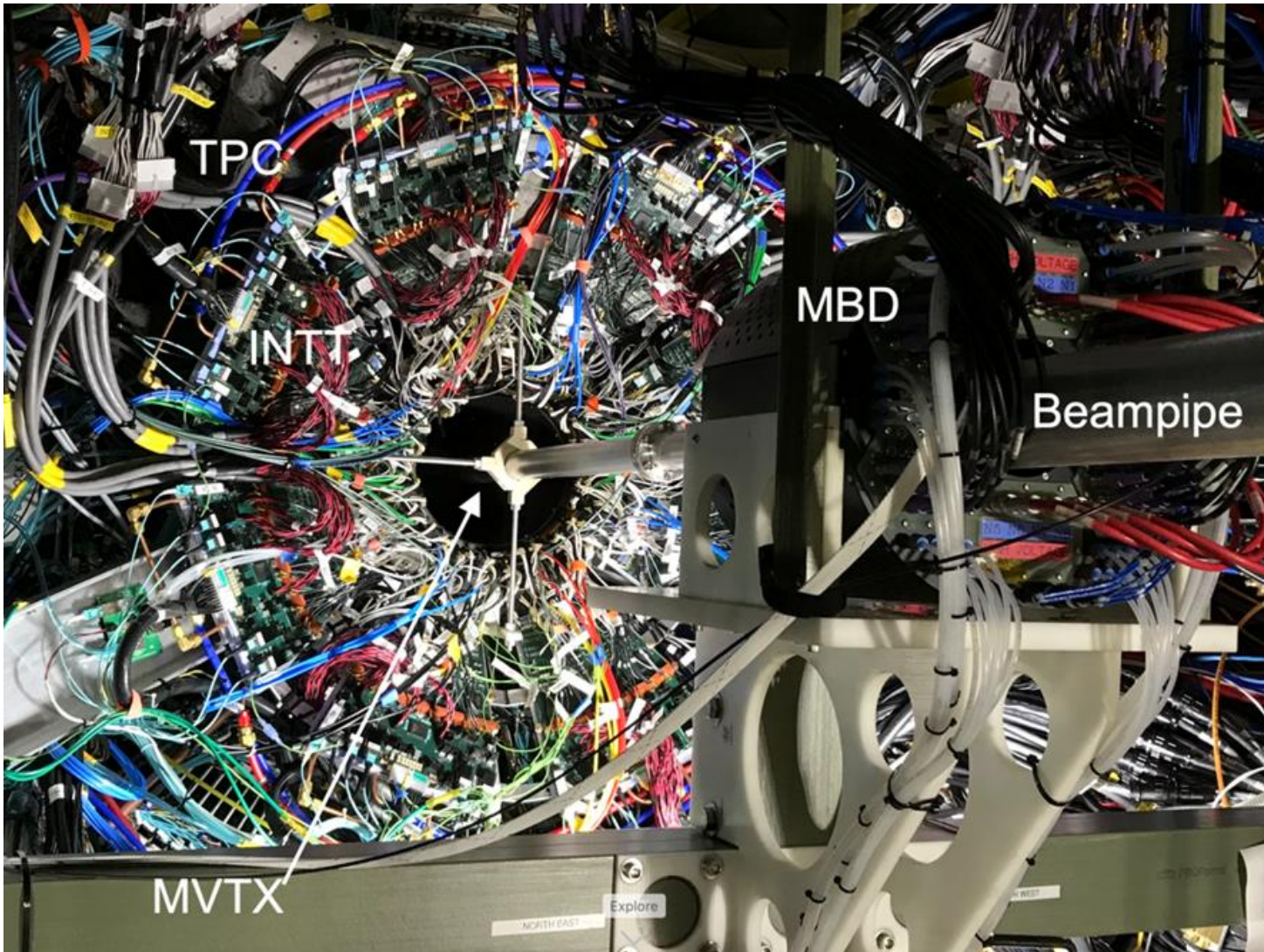
“the global spin alignment measurements will give scientists a new way to study local fluctuations in the strong force.”

New Type of Entanglement Lets Scientists ‘See’ Inside Nuclei (posted: 3/22/2023) *Science Advances* **9**, 1 (2023)

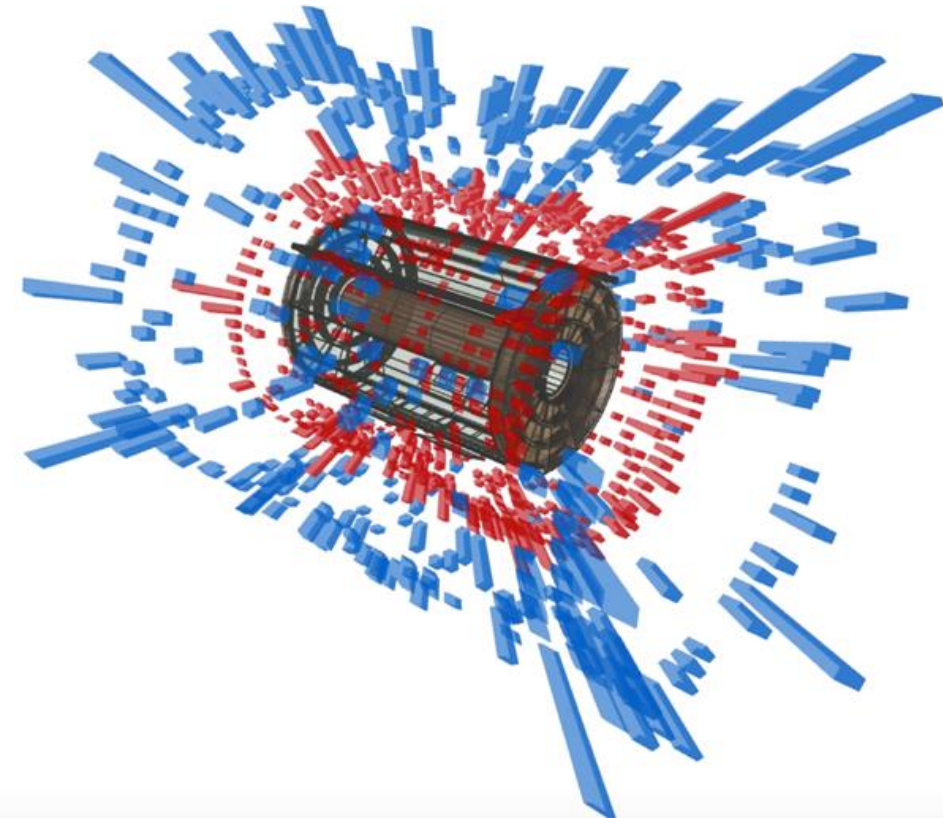


“The quantum interference measurement is between dissimilar particles that strike meters apart in the STAR detector. This discovery could lead to new ways to harness quantum entanglement.”

Another highlight: sPHENIX installed!



sPHENIX Experiment at RHIC
Data recorded: 2023-05-22, 02:07:00 EST
Run / Event: 7156 / 12
Collisions: Au + Au @ 200 GeV



New Faculty hires in Heavy Ions

- A list (possibly incomplete) of new hires in Heavy Ions:
 - MIT
 - Ohio State
 - Texas
 - Vanderbilt
 - Yale
- The ability to convince the faculty (many in other fields) to invest in a new professor shows that heavy ions remain a vibrant field!

Summary

- The research budget remains challenging, but the best proposals will continue to be funded.
- Comparative review of proposals provides more community input to the funding decisions.
- Many highlights submitted to DOE. **Keep up the good work!!**
- From many metrics, relativistic heavy ion collisions is an exciting and vibrant field.