Simulation study of bottomonium suppression measurement by the sPHENIX experiment.

Alexandre Lebedev
Iowa State University
on behalf of the **sPHENIX** collaboration

Quark Matter 2022 - the 29th International Conference on Ultra-relativistic Nucleus-Nucleus Collisions
4-10 April 2022, Krakow, Poland

Brookhaven National Laboratory

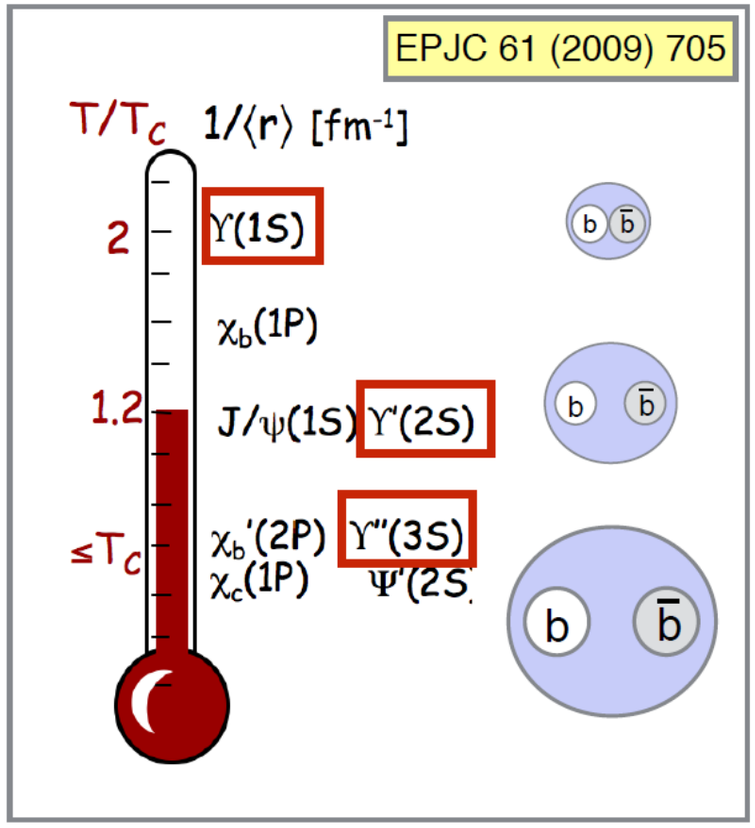
ISU

sPHENIX

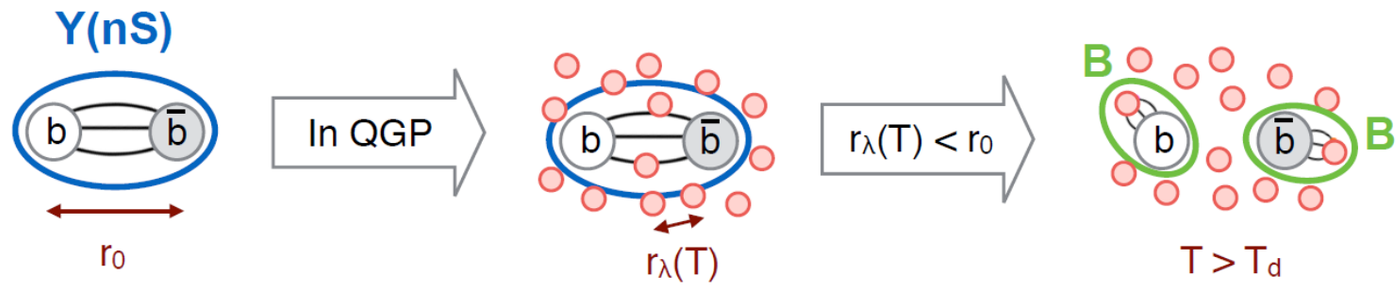
Motivation

Upsilons can be used as powerful tools to study QGP

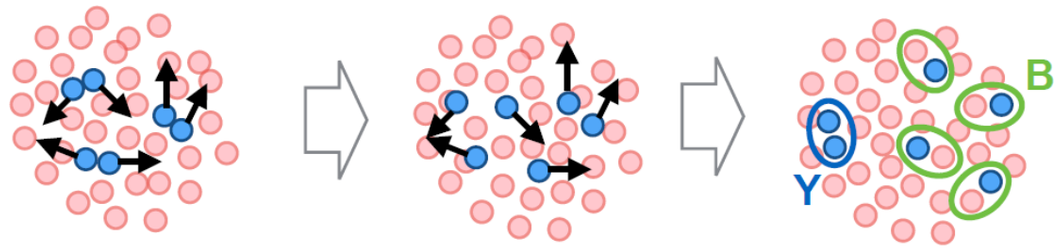
- Mainly produced at the early stages of the collisions
- Different non-prompt fraction and recombination than charmonia
- Upsilon states have similar kinematics but different binding energies



[Color screening]

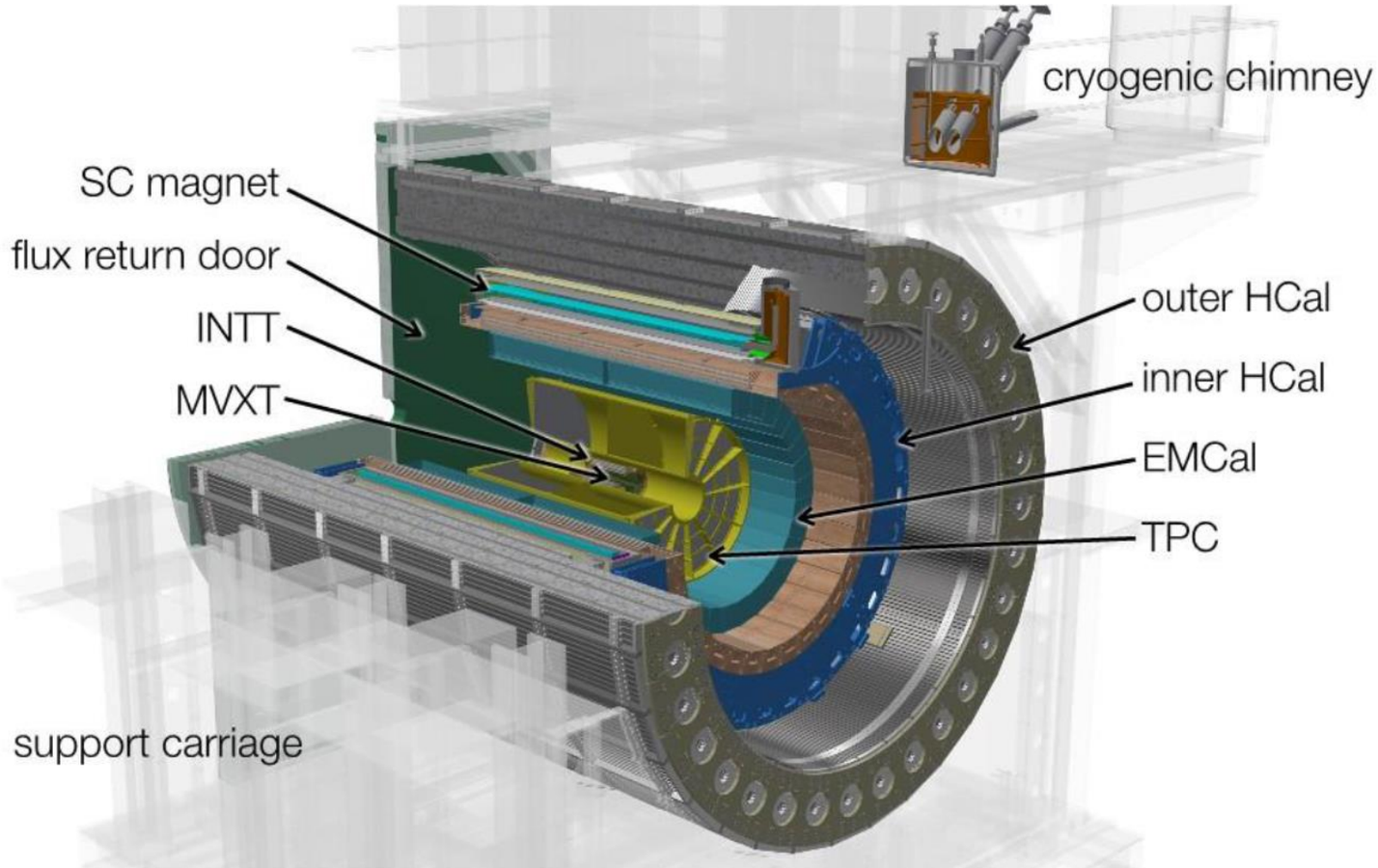


[Regeneration]



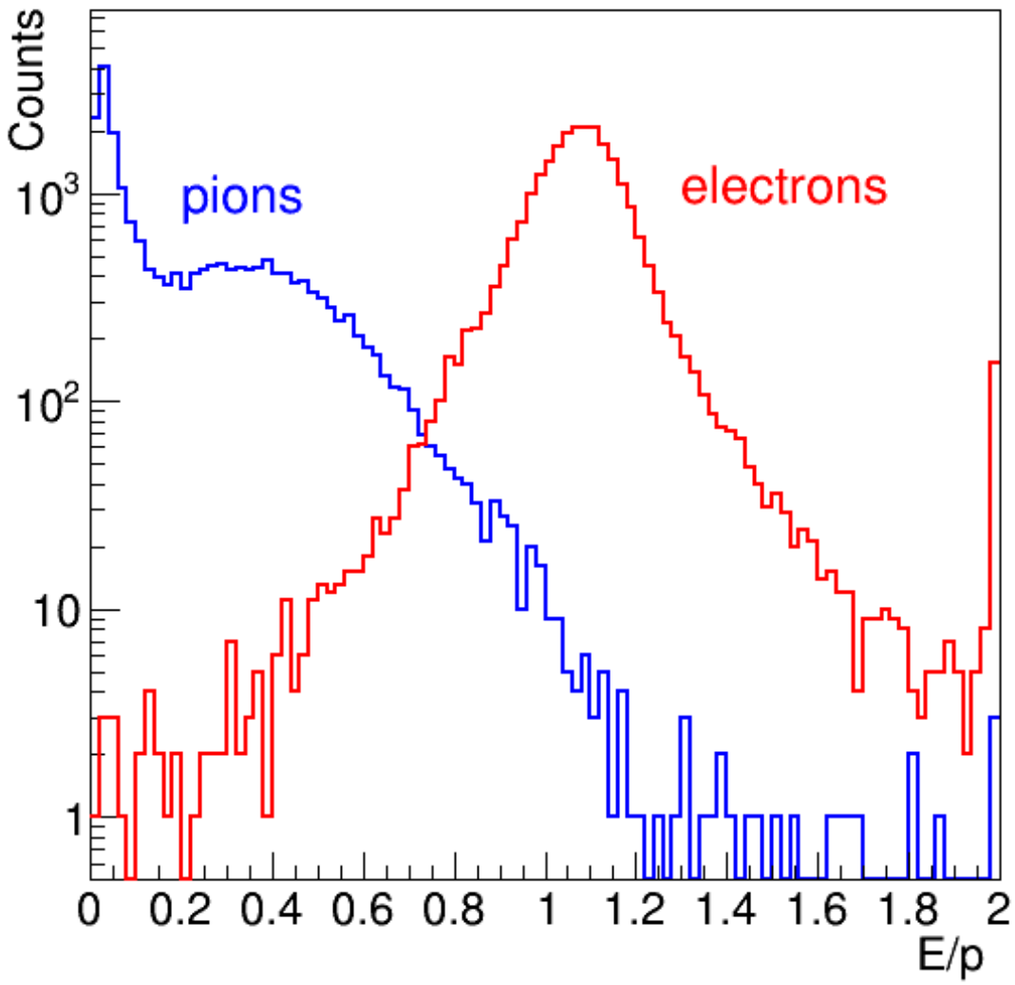
Upsilon reconstruction

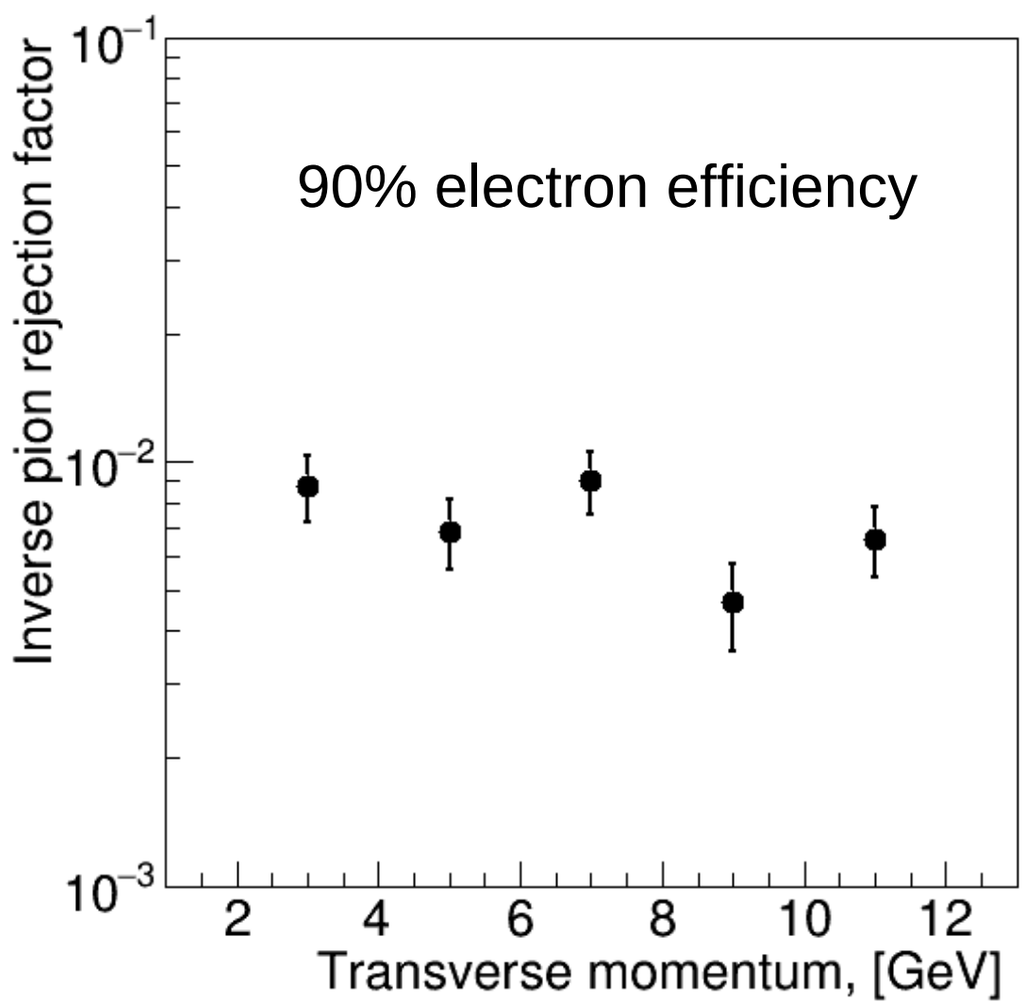
- Upsilons are reconstructed in the di-electron channel
- Electron p_T > 2 GeV/c removes background but keeps most Upsilons
- Hadrons rejected using EMCal and Inner HCAL



Electron identification in EMCal

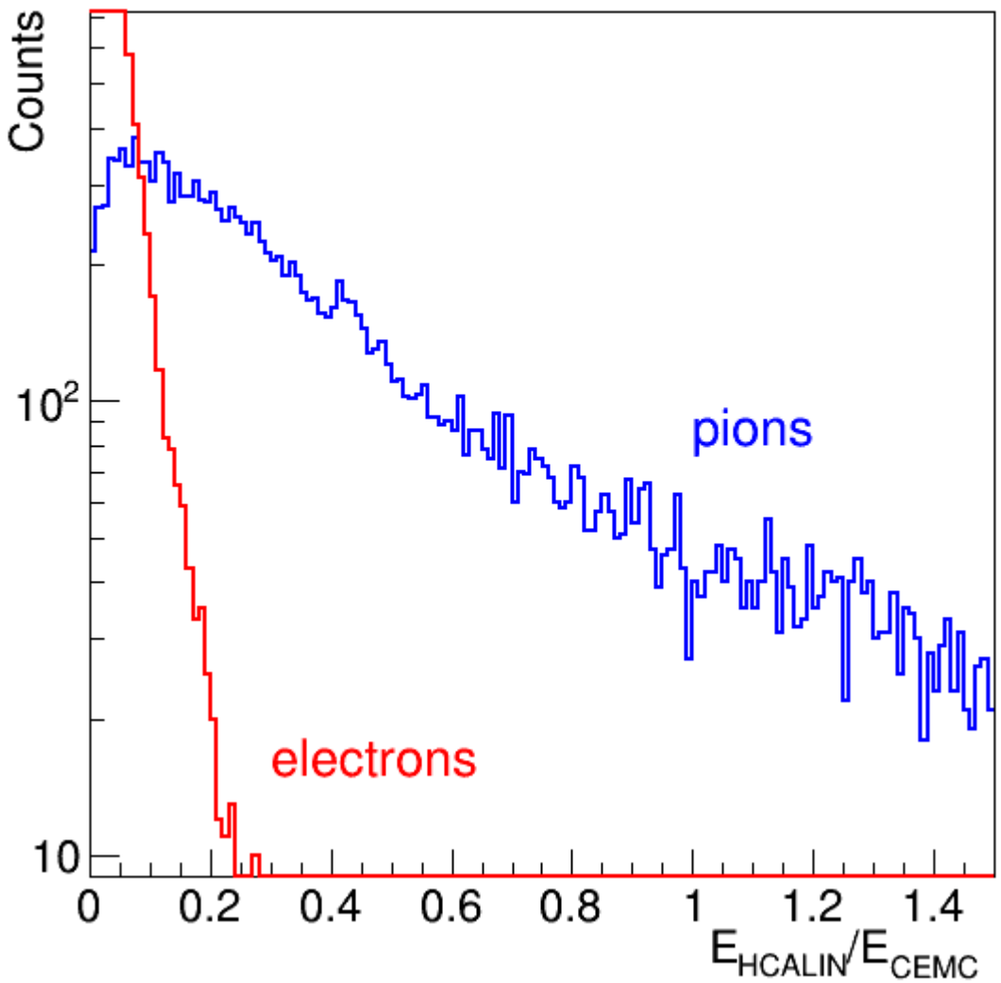
- Electrons/pions embedded in Min. Bias Au+Au Hijing events
- E/p cut is the main tool for hadron rejection
- Using core energy of the shower improves rejection
- Better than 100 pion rejection for 90% electron efficiency in Au+Au

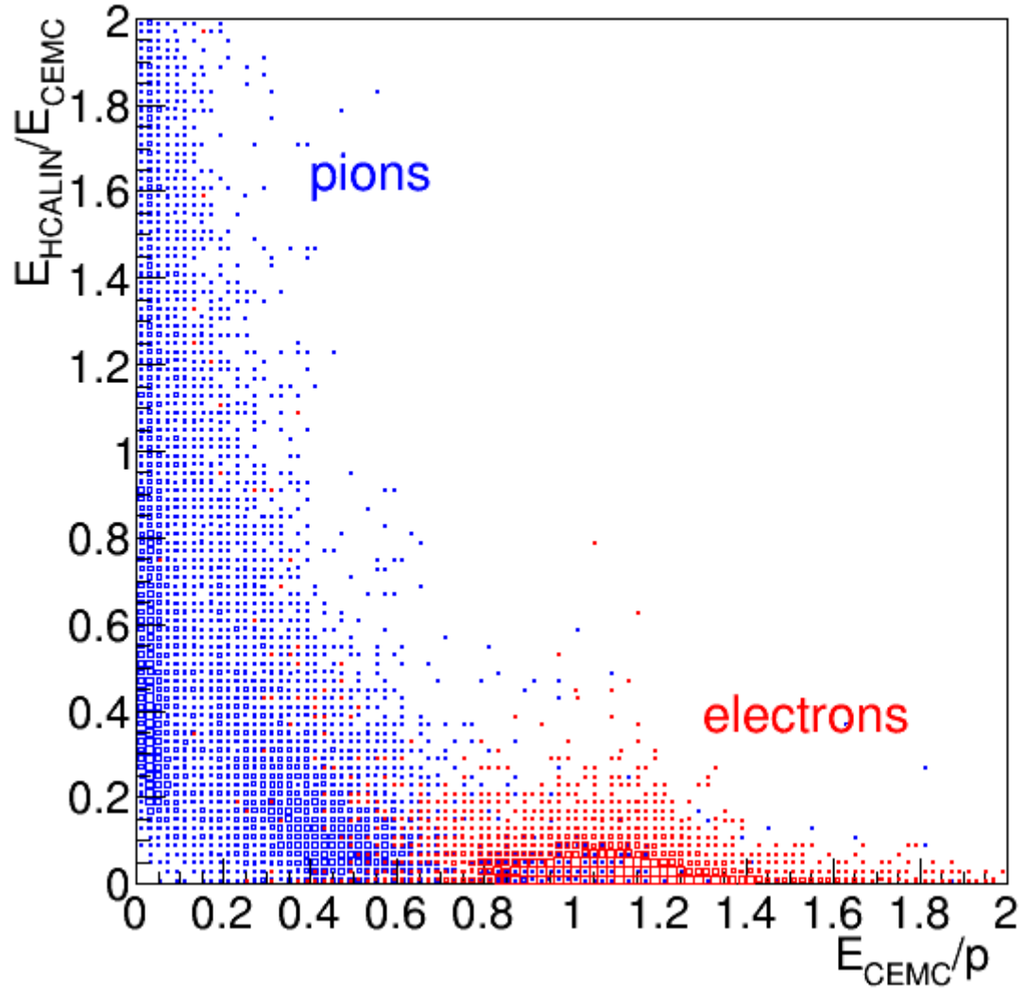




Electron indentification in Inner HCal

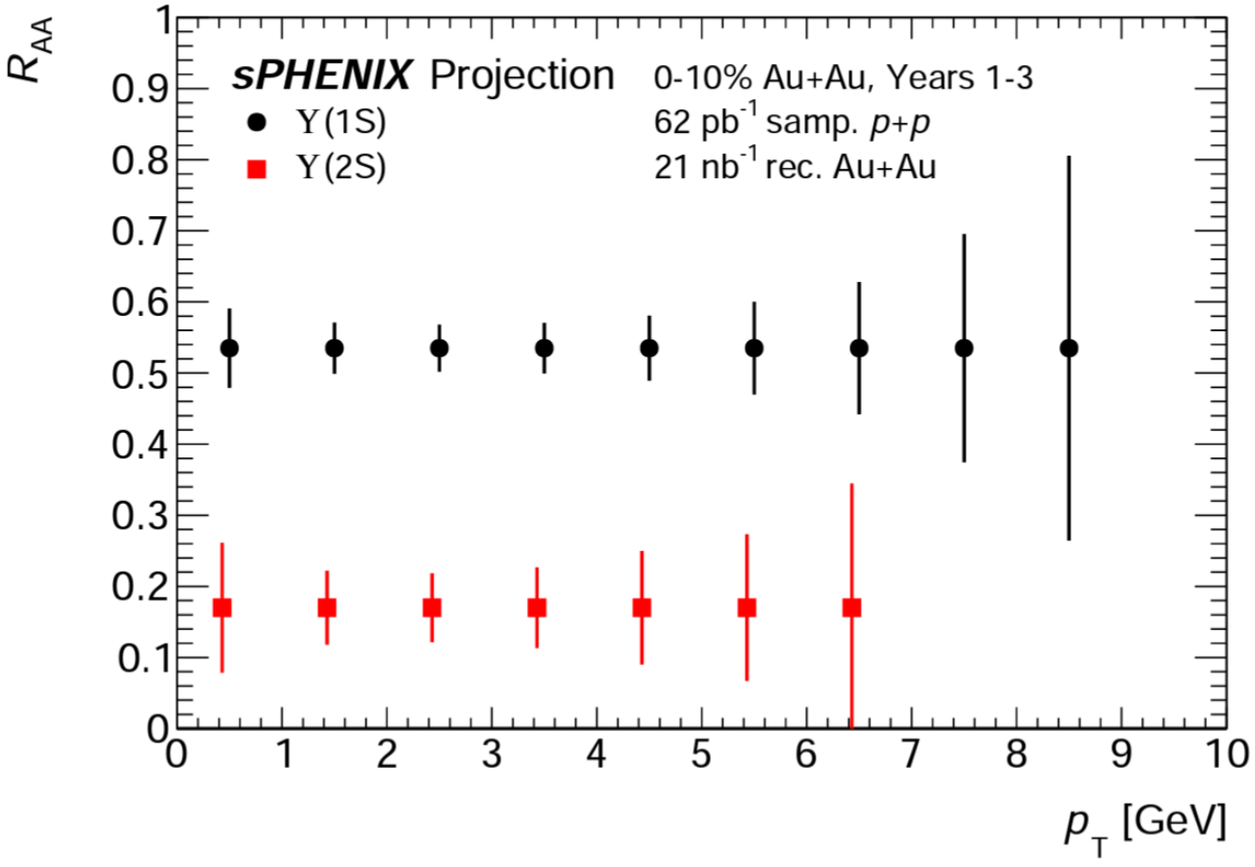
- Electrons deposit most energy in EMCal, hadrons in HCAL
- Good rejection power, but overlaps with E/p rejection in EMCal
- Requires sophisticated multi-dimensional cuts

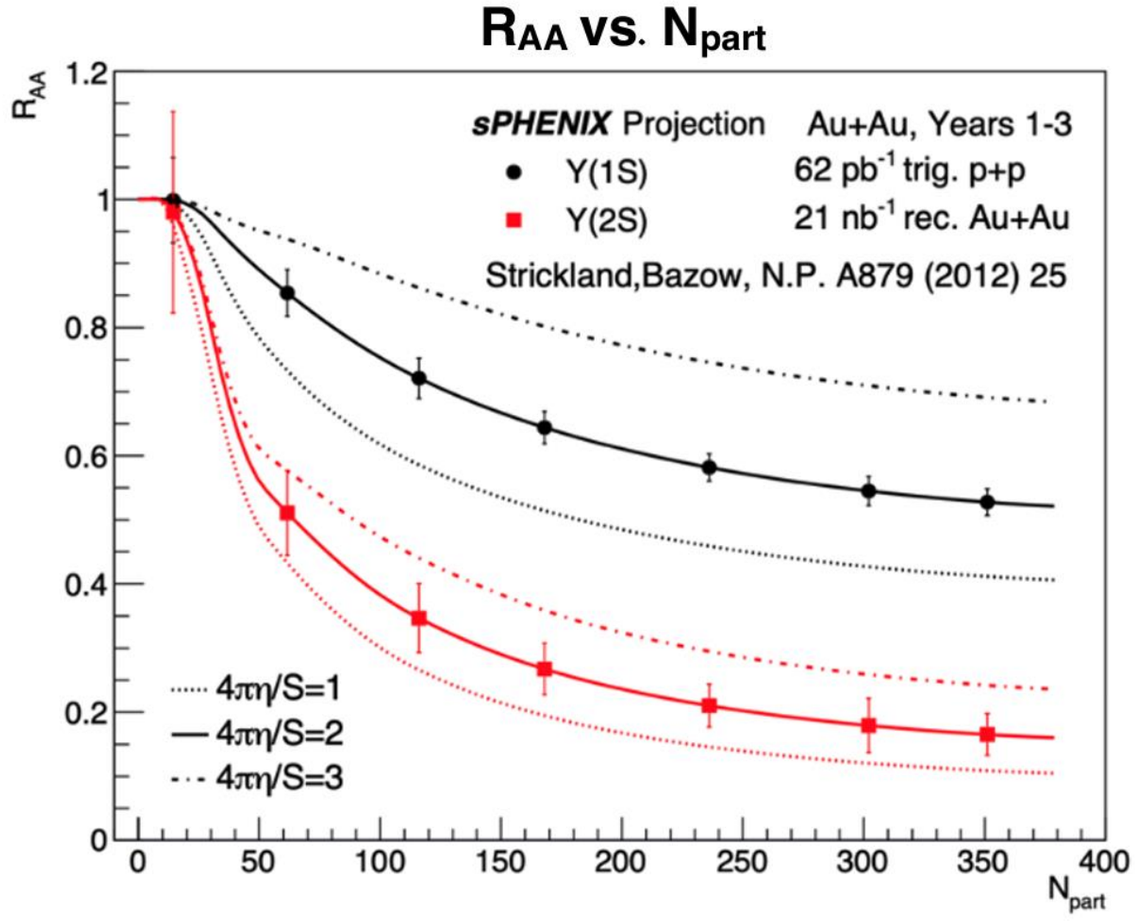




Projected R_{AA}

- Three year running plan assumed for the plots
- Realistic background simulation included in uncertainty estimate
- Y(3S) is expected to have statistically insignificant peaks in Au+Au





sPHENIX is supported by U.S. DEPARTMENT OF ENERGY | Office of Science