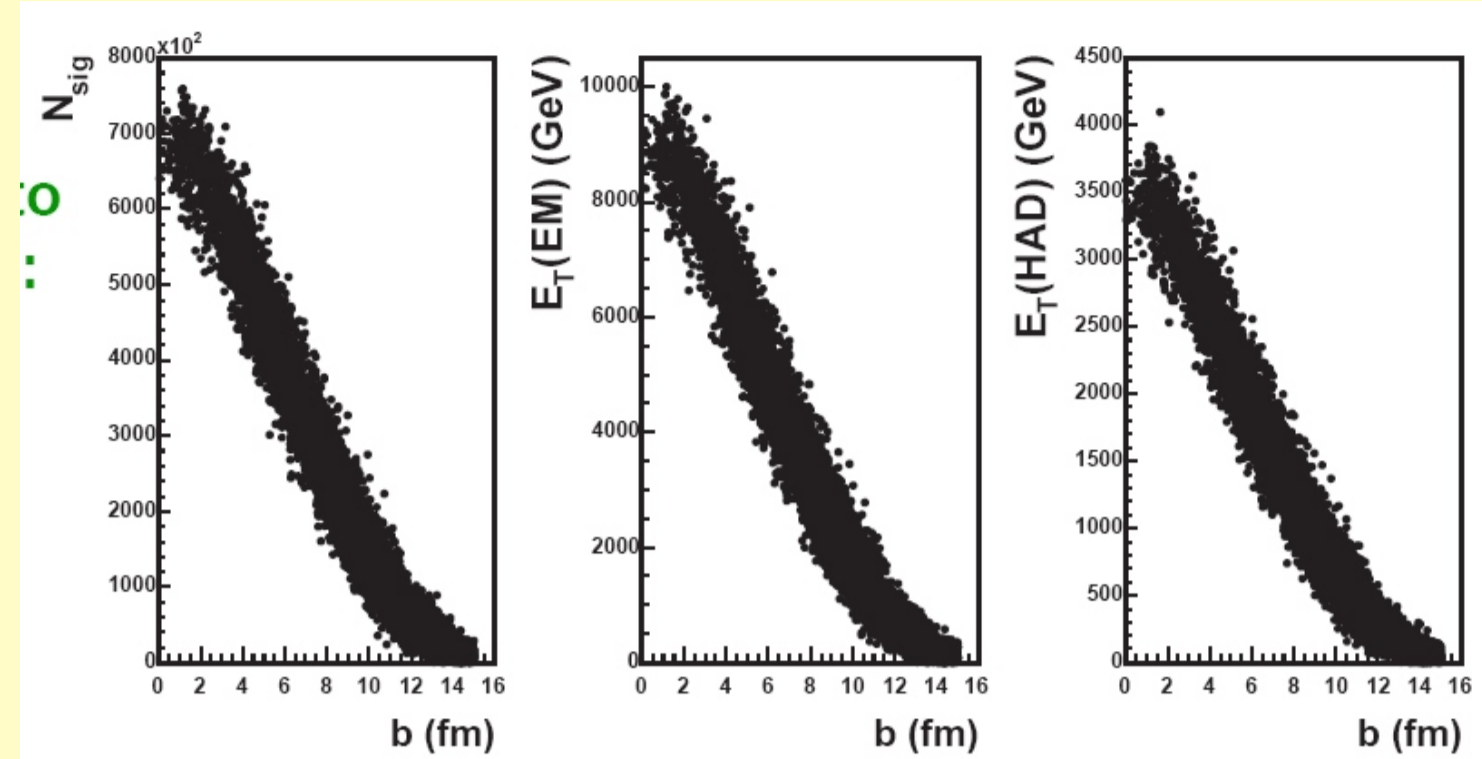


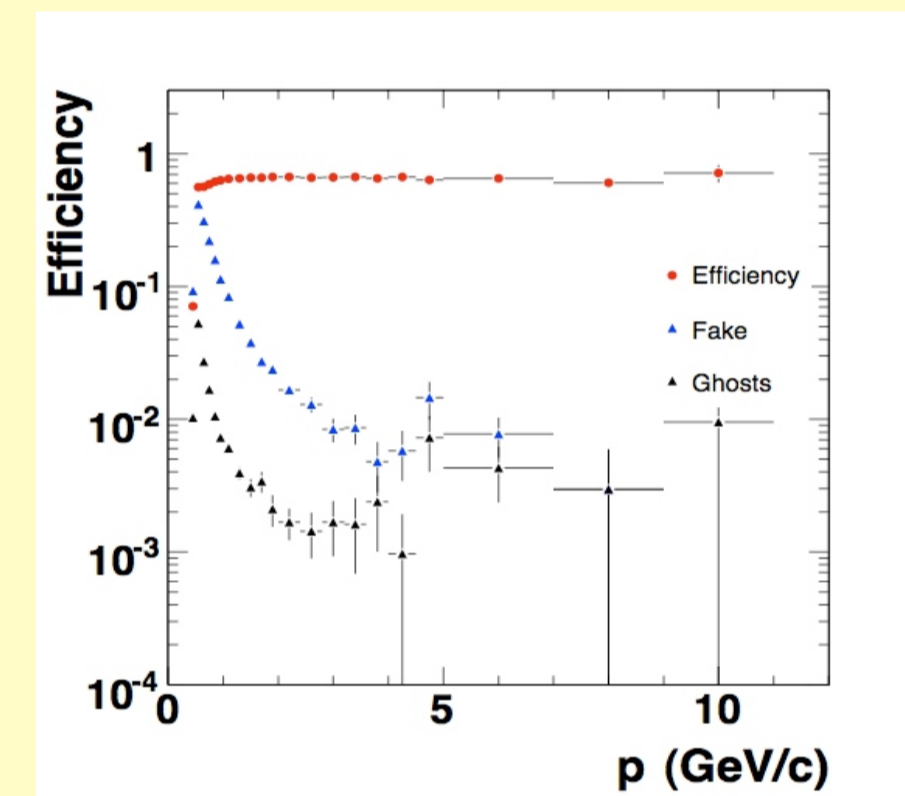
Global Event Variables

will represent the first-day measurements of N_{ch} , $dN_{ch}/d\eta$, ΣE_T , $dE_T/d\eta$, \mathbf{b} and further will serve for studies of more subtle collision features like the collective flow. Moreover, these variables are indispensable for almost all physics analyses.

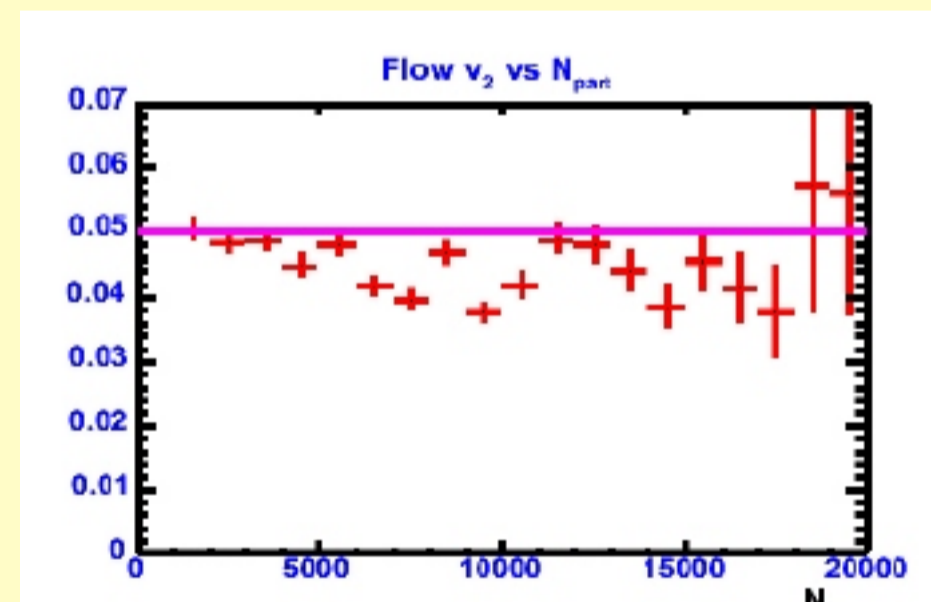
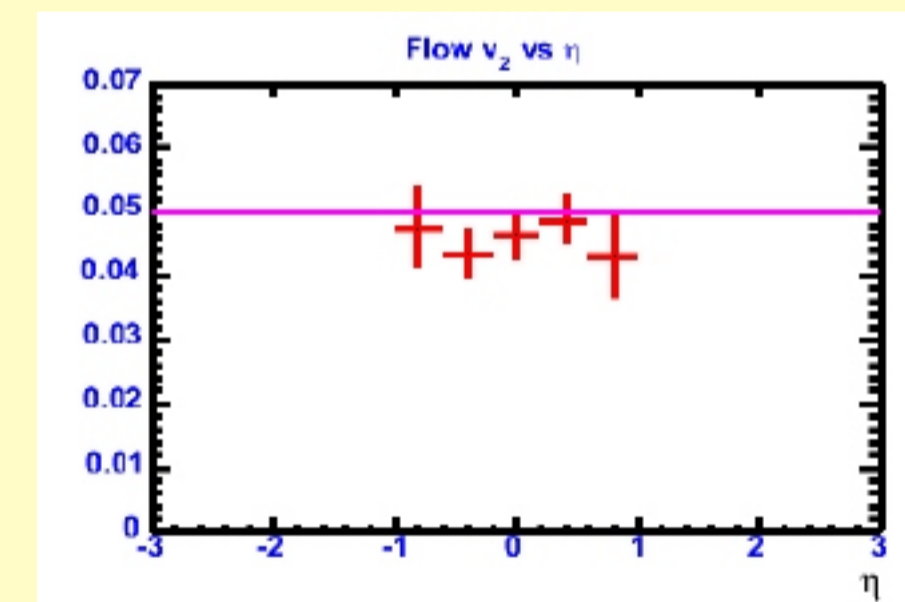
Resolution of the estimated impact parameter $\sim 1\text{fm}$ for all three systems - pixels and SCT, EM calorimeter and hadronic calorimeter.



Simulations show reasonable **tracking performance** in difficult heavy ion collision.



Hijing simulations of the **elliptic flow** with $v_2 = 0.05$; $\text{const}(N_{ch}, \eta, \gamma, p_T)$



Promising studies of the tracks within jets are coming.

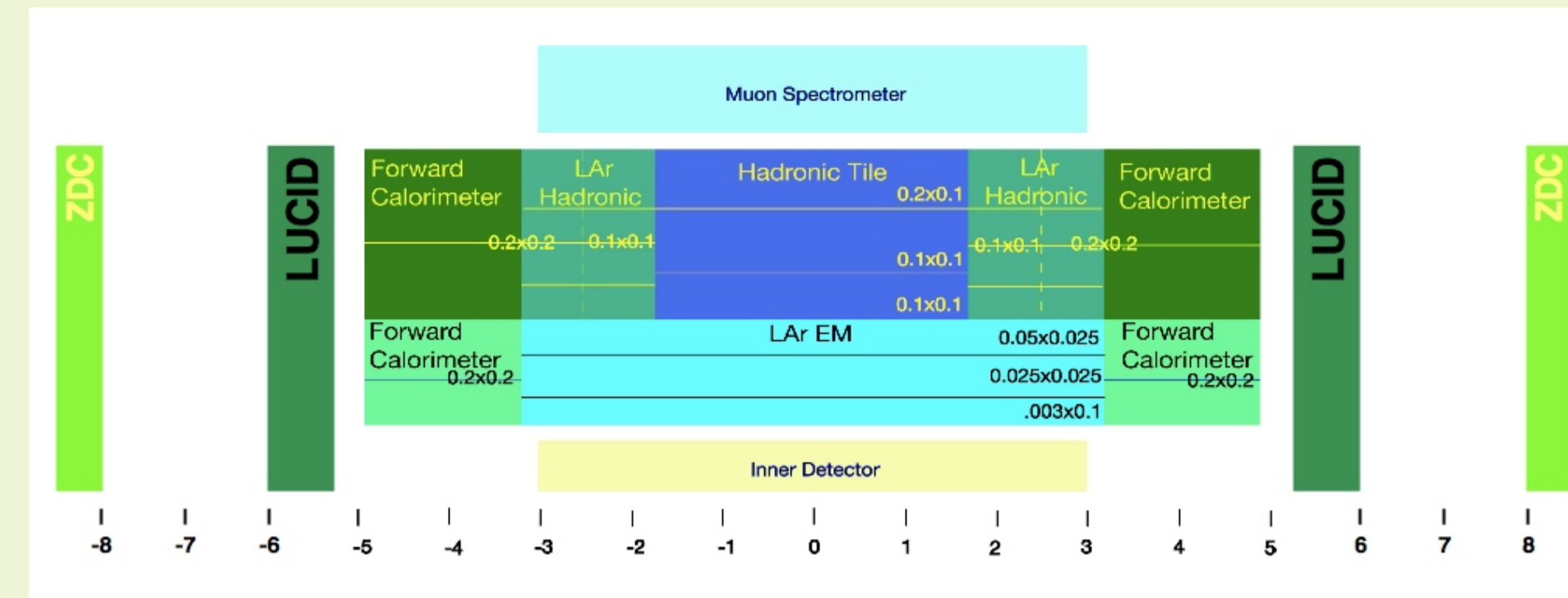
ATLAS Heavy-Ion Working Group

S. Aronson, K. Assamagan, M. Baker, B. Cole, R. Debbé, A. Denisov, M. Dobbs, J. Dolejsi, N. Grau, H. Gordon, F. Gianotti, I. Gavrilenko, V. Kostyukin, S. Lebedev, M. Leltchouk, M. Levin, F. Marroquim, A. Moraes, J. Nagle, P. Nevski, A. Olszewski, V. Pozdnyakov, M. Rosati, L. Rosselet, M. Spousta, P. Steinberg, H. Takai, S. Tapprogge, S. Timoshenko, B. Toczé, A. Trzupek, M.A.B. Vale, Yu. Vertogradova, F. Videbaek, S. White, B. Wosiek, K. Woźniak

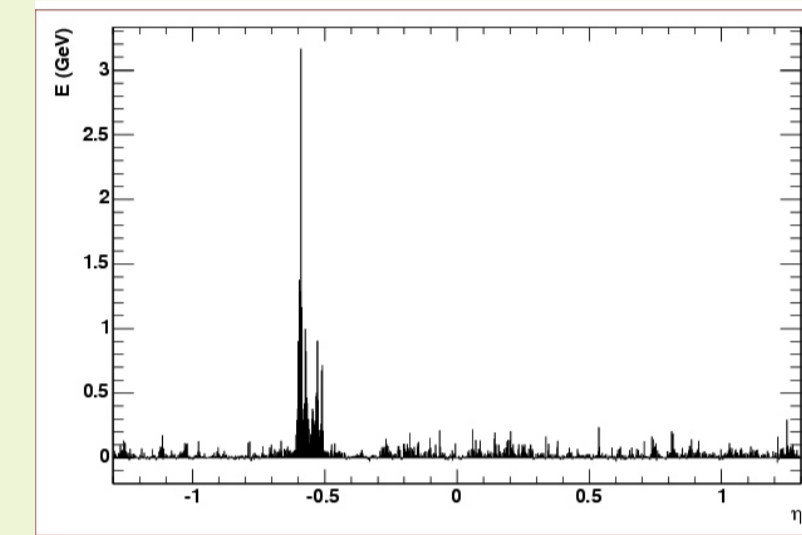
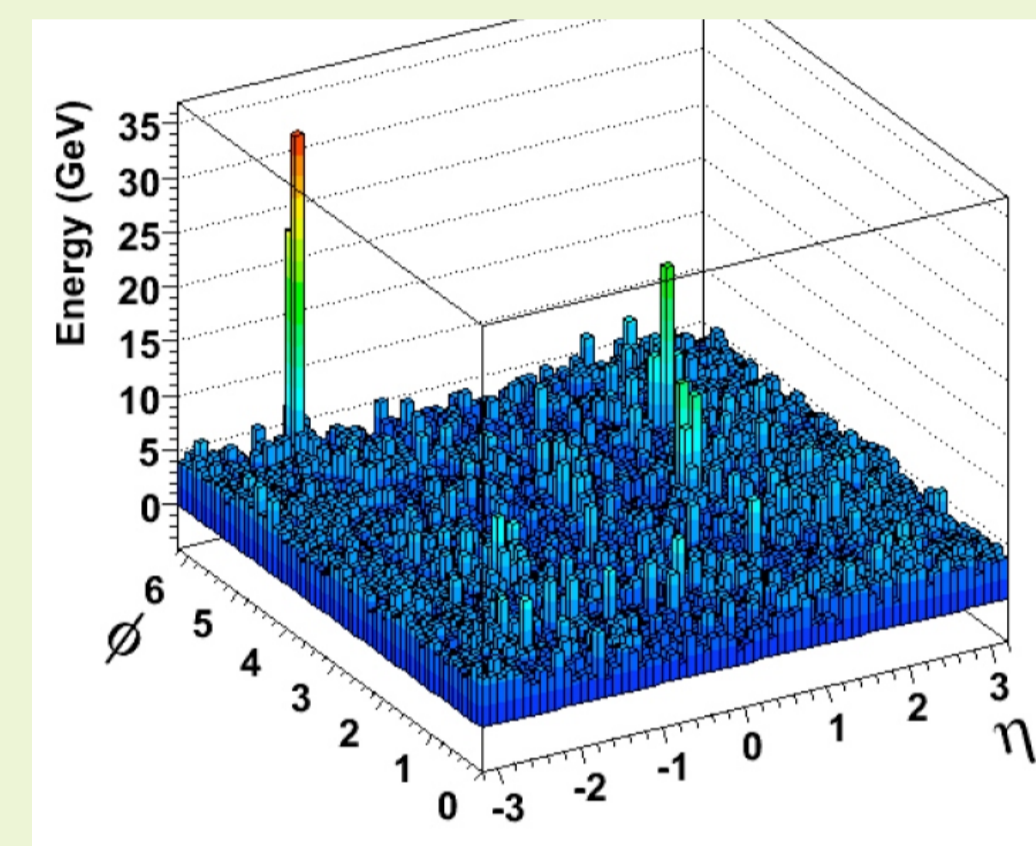
Brookhaven National Laboratory, CERN, Columbia University, Iowa State University, Charles University Prague, Institute of Nuclear Physics PAN Cracow, Lebedev Institute Moscow, Moscow Engineering Physics Institute, Universidade Federal do Rio de Janeiro, University of Colorado, University of Geneva

Jets

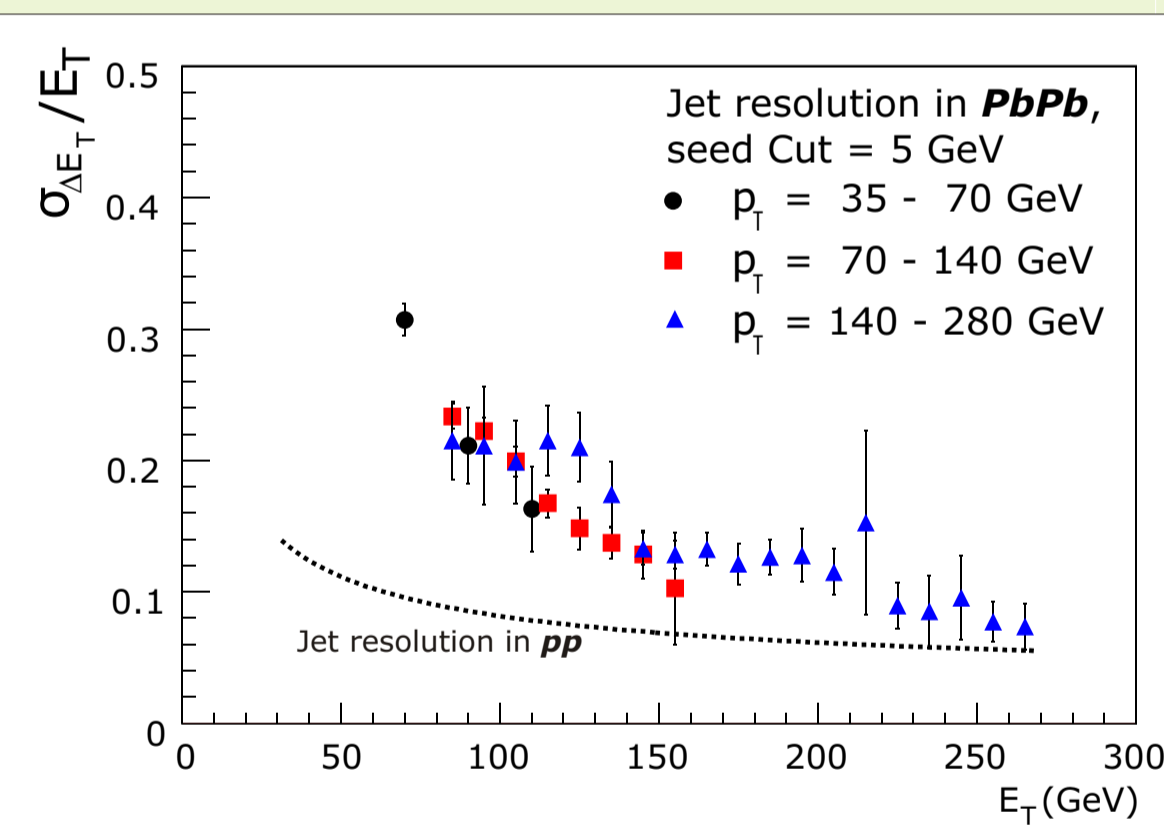
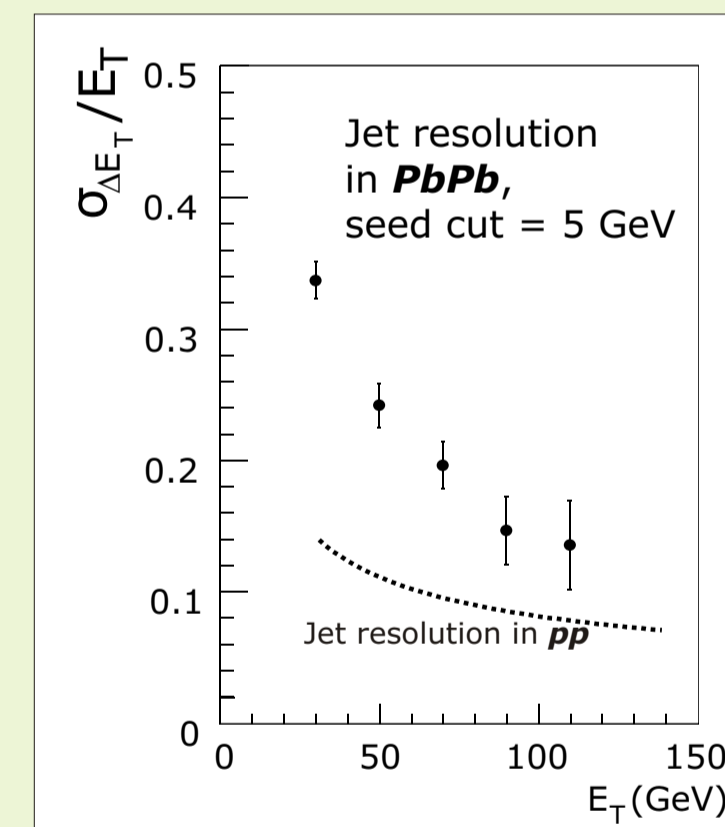
Jet studies will employ the wide acceptance and fine granularity of the ATLAS calorimetric system (LUCID and ZDC in progress)



Here photons are clearly visible above the background in the first layer of the EM calorimeter.

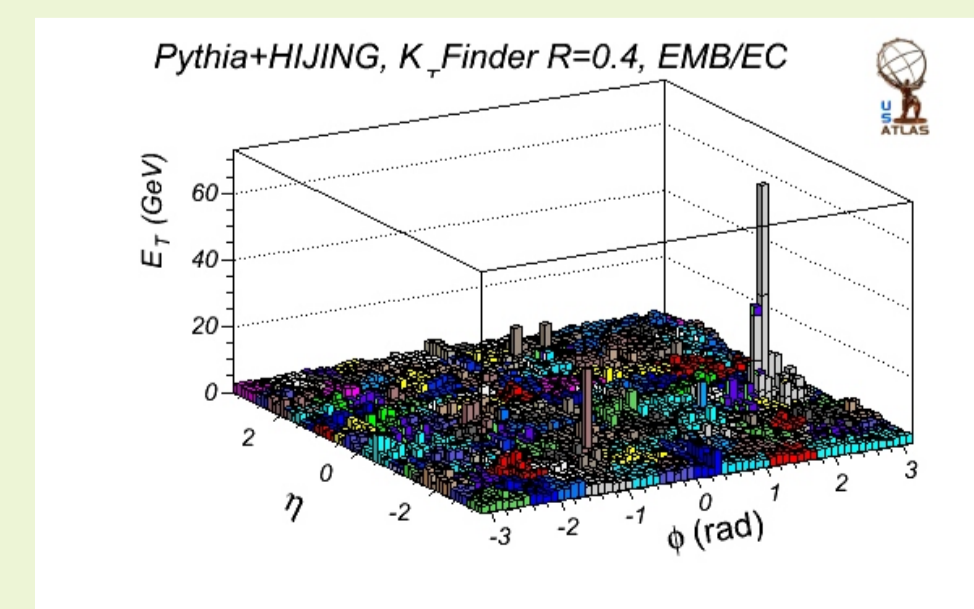


Separation of jets from the background is intensively studied - resolution for jets in $PbPb$ is clearly worse than for pp , but the jet finding and energy measurement in full ATLAS simulations work

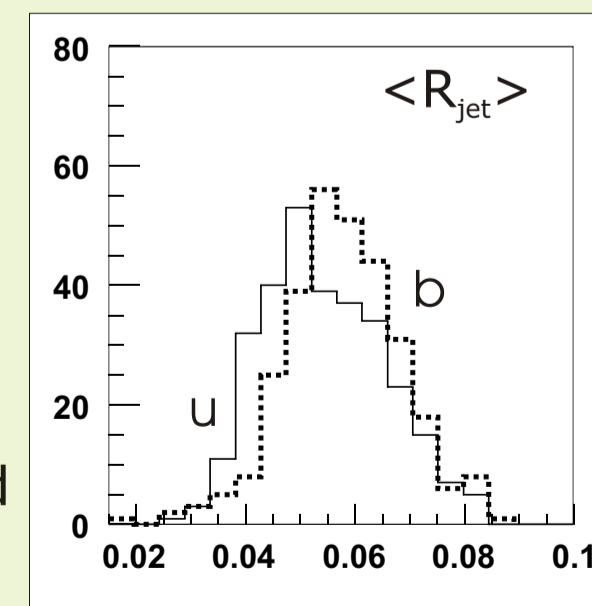


The left figure shows the resolution from simulations with old ATLSIM, the right figure displays results from the new ATHENA simulations. Several methods of background subtraction procedure are tested.

The goal of the studies is to be prepared to measure also the modification of the jet profiles and particle content of jets. The sensitivity to the jet profile is illustrated on the the difference of the first radial moment of the jet energy distribution (measured from the jet axis) between u- and b-quarks.

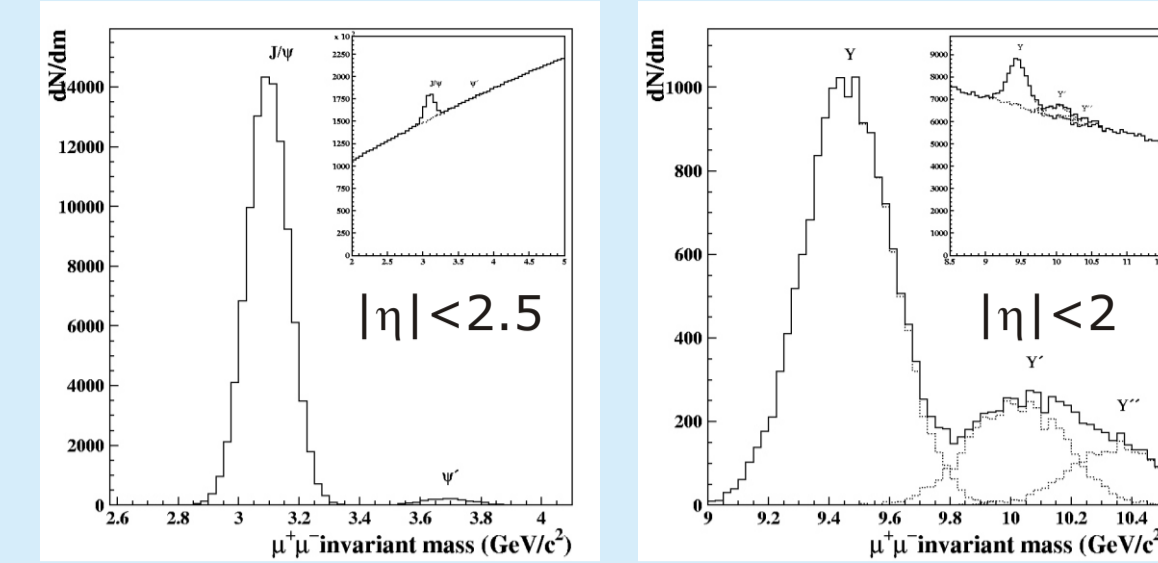


Several algorithms in addition to the cone algorithm are under study. The jet finding by Fast- k_T is illustrated in the left figure.

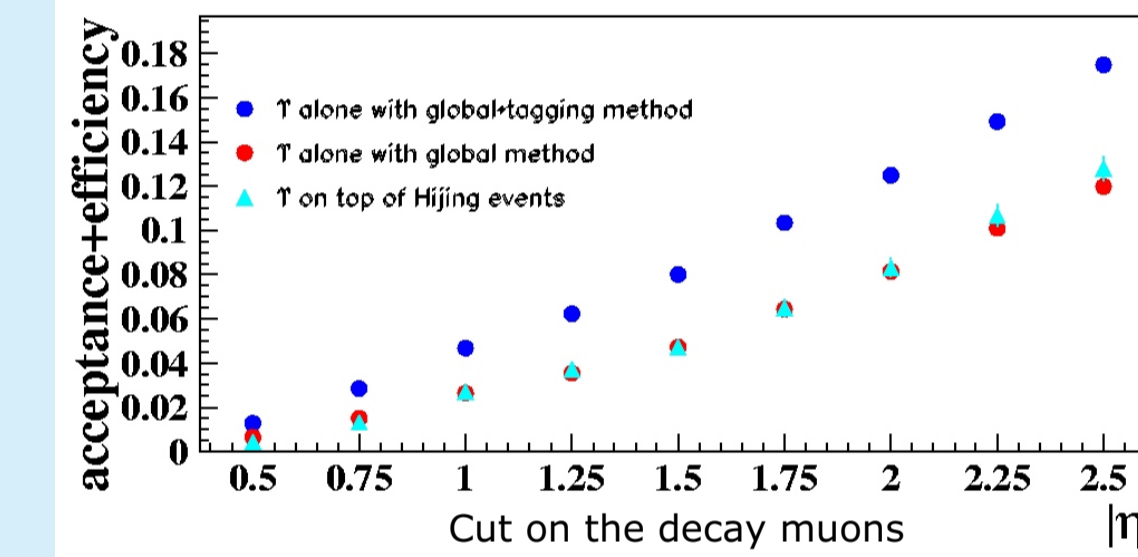
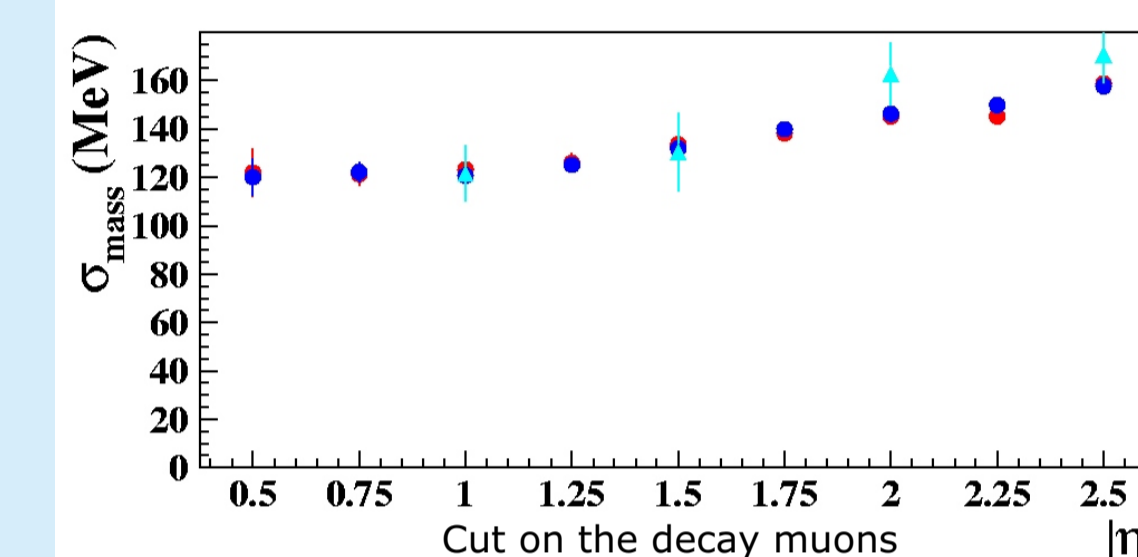
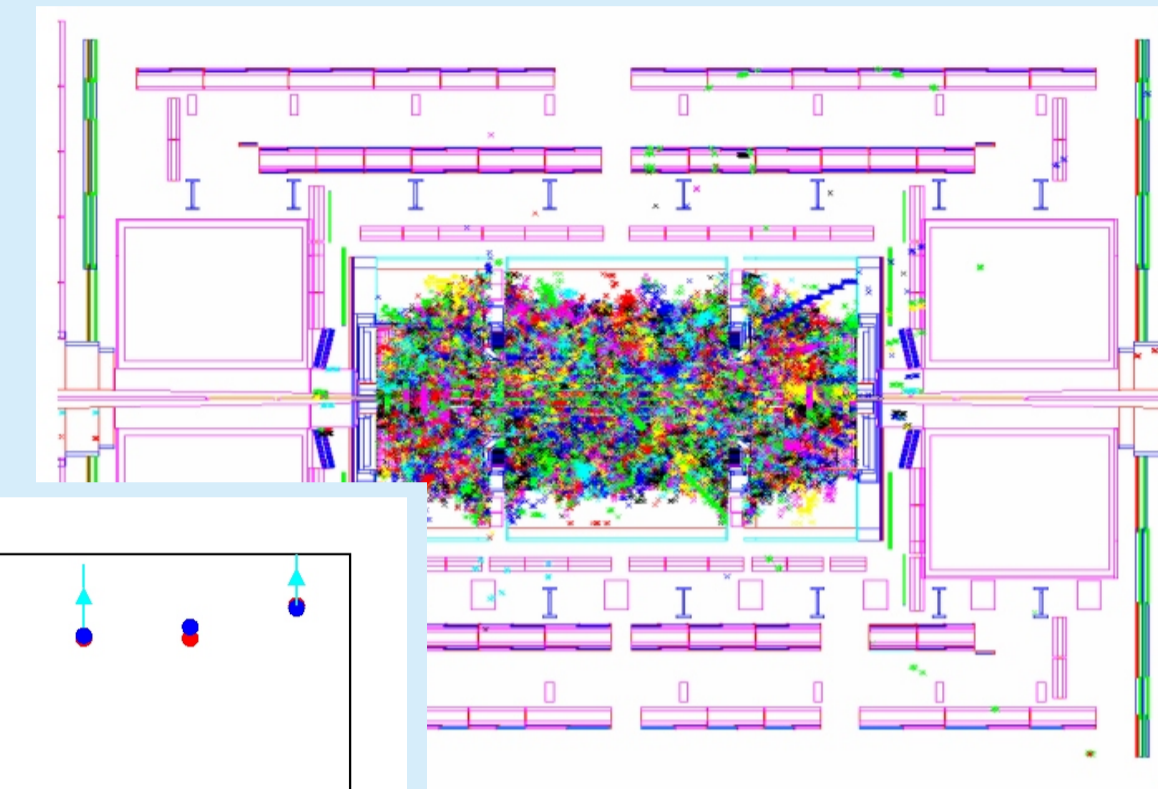


Quarkonia

Measurements of quarkonia suppression allow to study the screening of the heavy-quark potential. The suppression serves as a thermometer for the plasma.



ATLAS HI group passed the journey from clean onia decays to full simulation with HIJING background, resulting in acceptable resolution and acceptance:



For reconstruction of low momentum muons two methods have been used: **A:** tracks fully traversing the muon spectrometer were used and associated with ID tracks through a global fit. **B:** using ID tracks whose extrapolation coincide with a track segment in the muon spectrometer.

The dimuon quarkonia decay is then reconstructed again via two ways: "Global Fit" with both muons reconstructed by method A, or "Global+Tag" where at least one muon appears from method A, the other one either from A or B. Here are the results:

	$\Upsilon \rightarrow \mu^+ \mu^-$ $p_T^{\mu} > 3 \text{ GeV}$			$J/\psi \rightarrow \mu^+ \mu^-$ $p_T^{\mu} > 1.5 \text{ GeV}$
	$ \eta < 1$	$ \eta < 2$	$ \eta < 2.5$	
Global Fit				
Global+Tag				
Acceptance & efficiency	2.6%	8.1%	12%	0.151%
Resolution	4.7%	12.5%	17.5%	0.530%
S/B	123 MeV	145 MeV	159 MeV	68 MeV
S/ $\sqrt{S+B}$	0.4	0.3	0.3	0.2
	0.3	0.2	0.2	0.15
S/ $\sqrt{S+B}$	31	45	55	72
	37	46	55	113
Rate/month (0.4 nb ⁻¹)		10 000	15 000	30 000
				104 000

The TRT has not been considered for this study. A compromise has to be found between acceptance and resolution to clearly separate the upsilon states with maximum statistics, e.g. with a eta cut of 2 on the decay muons. A similar cut is not needed for the J/ψ .

A study of upsilon and $J/\psi \rightarrow e^+ e^-$ is under way.