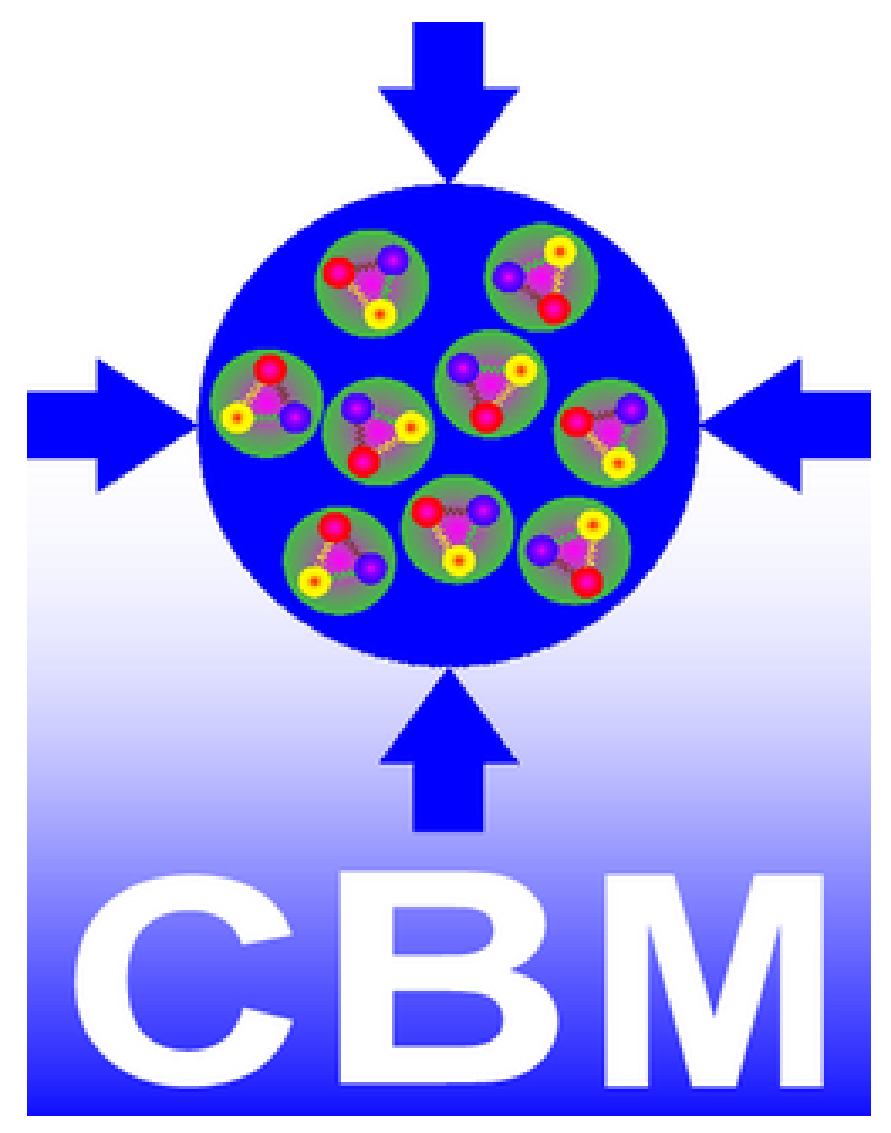
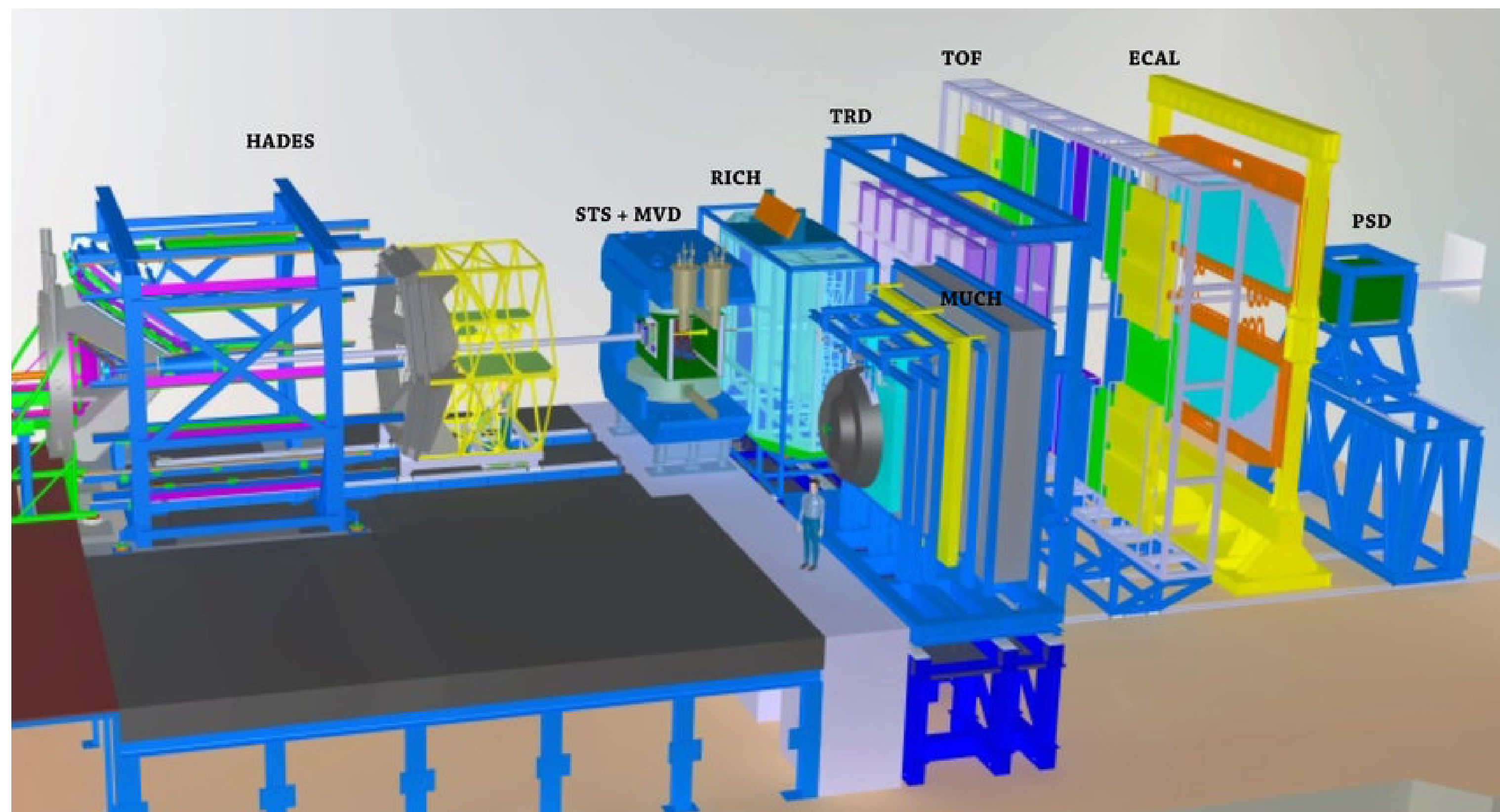


Reconstruction of neutral mesons in heavy ion collisions using the conversion method with HADES and CBM experiments



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Introduction

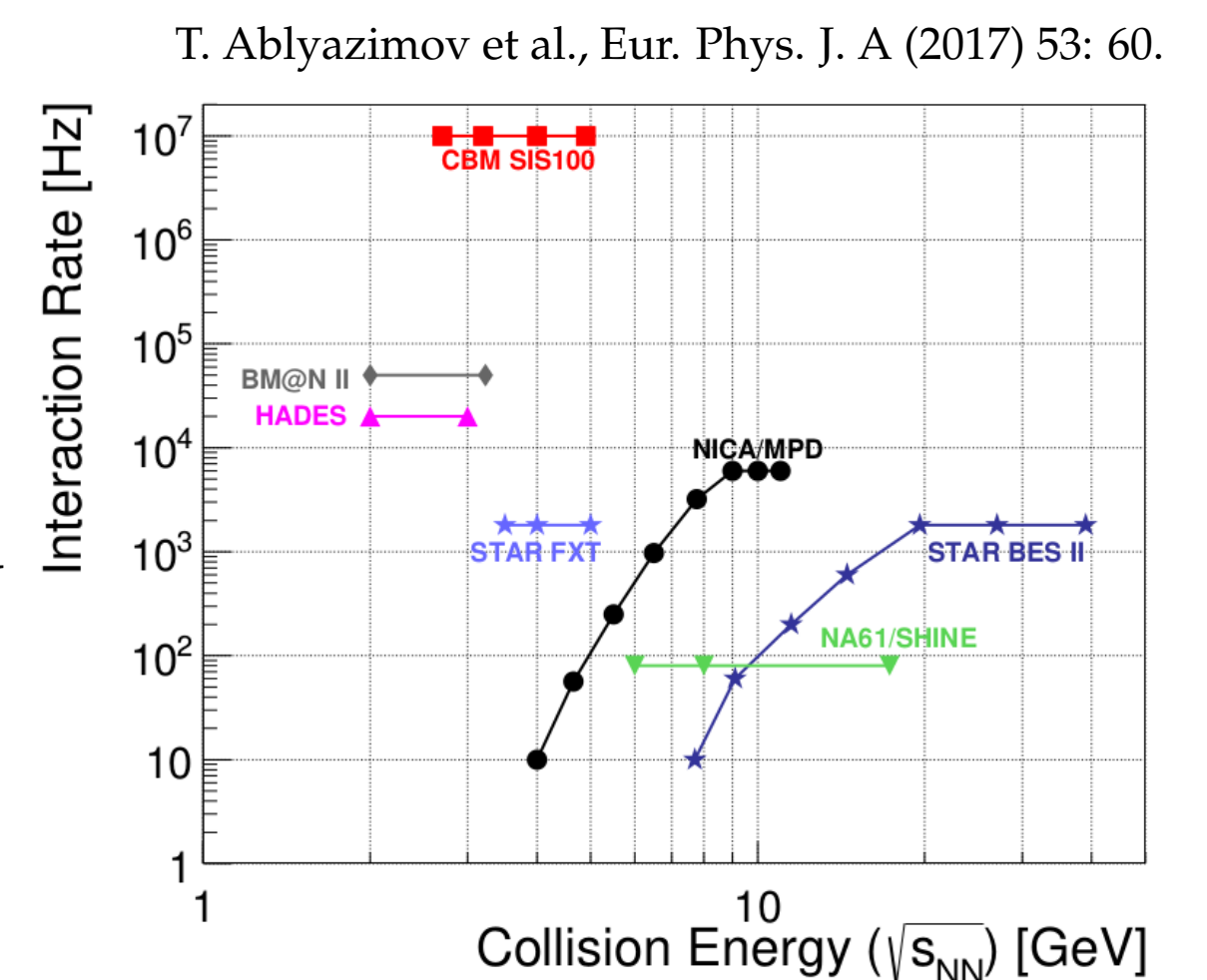


HADES

- fixed target
- p+p, p+A, A+A
- $\sqrt{s_{NN}} = 2 - 3$ GeV
- $\theta = 18^\circ - 85^\circ$
- ν up to 20 kHz

CBM

- fixed target
- p+p, p+A, A+A
- $\sqrt{s_{NN}} = 2.7 - 5$ GeV
- $\theta = 2.5^\circ - 35^\circ$
- ν up to 10 MHz



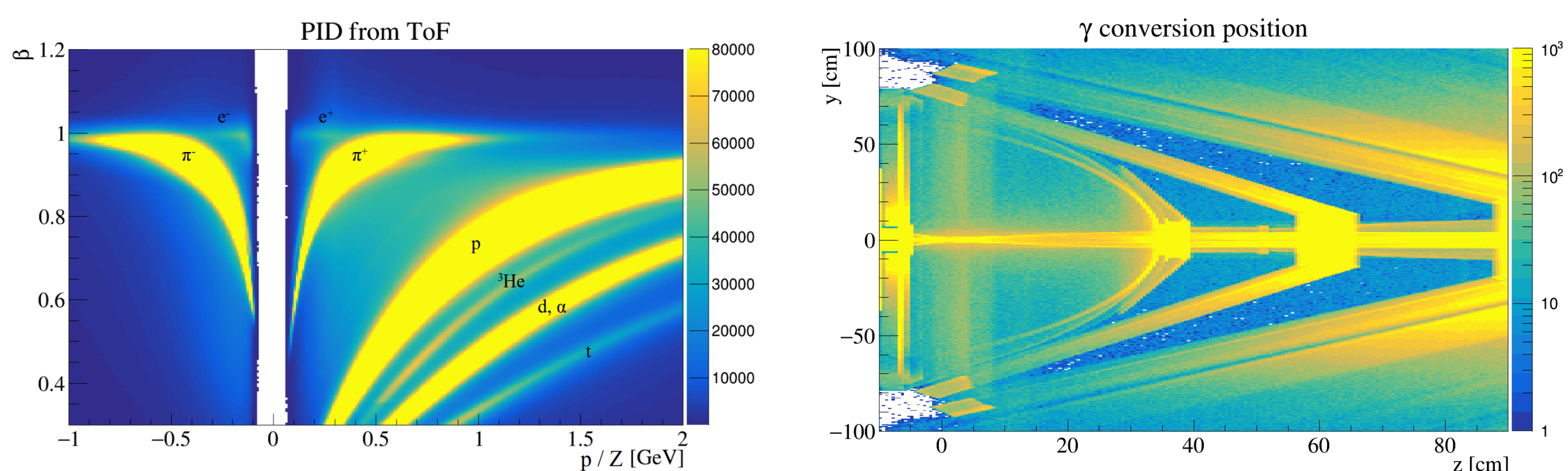
Physic cases:

- The equation-of-state of baryonic matter at neutron star densities
- In-medium properties of hadrons
- Phase transitions from hadronic matter to quarkyonic or partonic matter at high net-baryon densities
- Hypernuclei, strange di-baryons and massive strange objects

π^0 and η analysis concept with HADES

The analysis is based on a sample of 6×10^9 Ag+Ag collisions at 1.58 AGeV collected in March 2019. The reconstruction steps include:

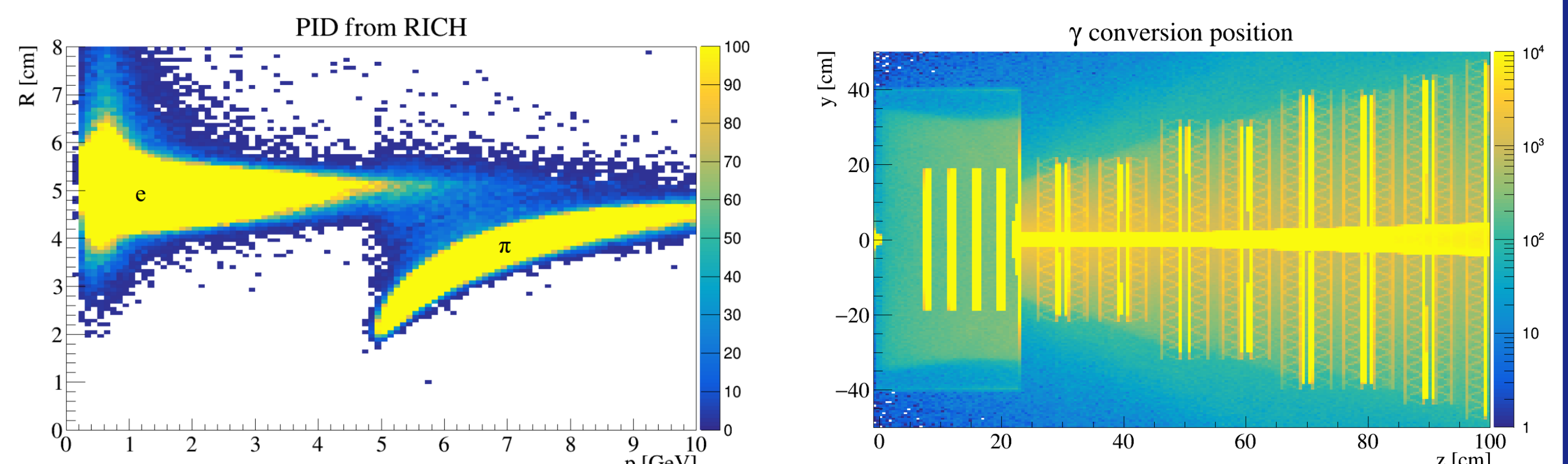
- tracking from two sets of Multiwire Drift Chambers (MDC)
- PID from RICH and Time-of-Flight (ToF) detectors
- invariant mass of lepton pair $m_{inv}(e^+e^-) < 100$ MeV/c²
- opening angle of lepton pair $\theta(e^+e^-) < 10^\circ$
- opening angle of photon pair for π^0 : $10^\circ < \theta_{\gamma\gamma} < 40^\circ$
- opening angle of photon pair for η : $40^\circ < \theta_{\gamma\gamma} < 110^\circ$



π^0 and η analysis concept with CBM

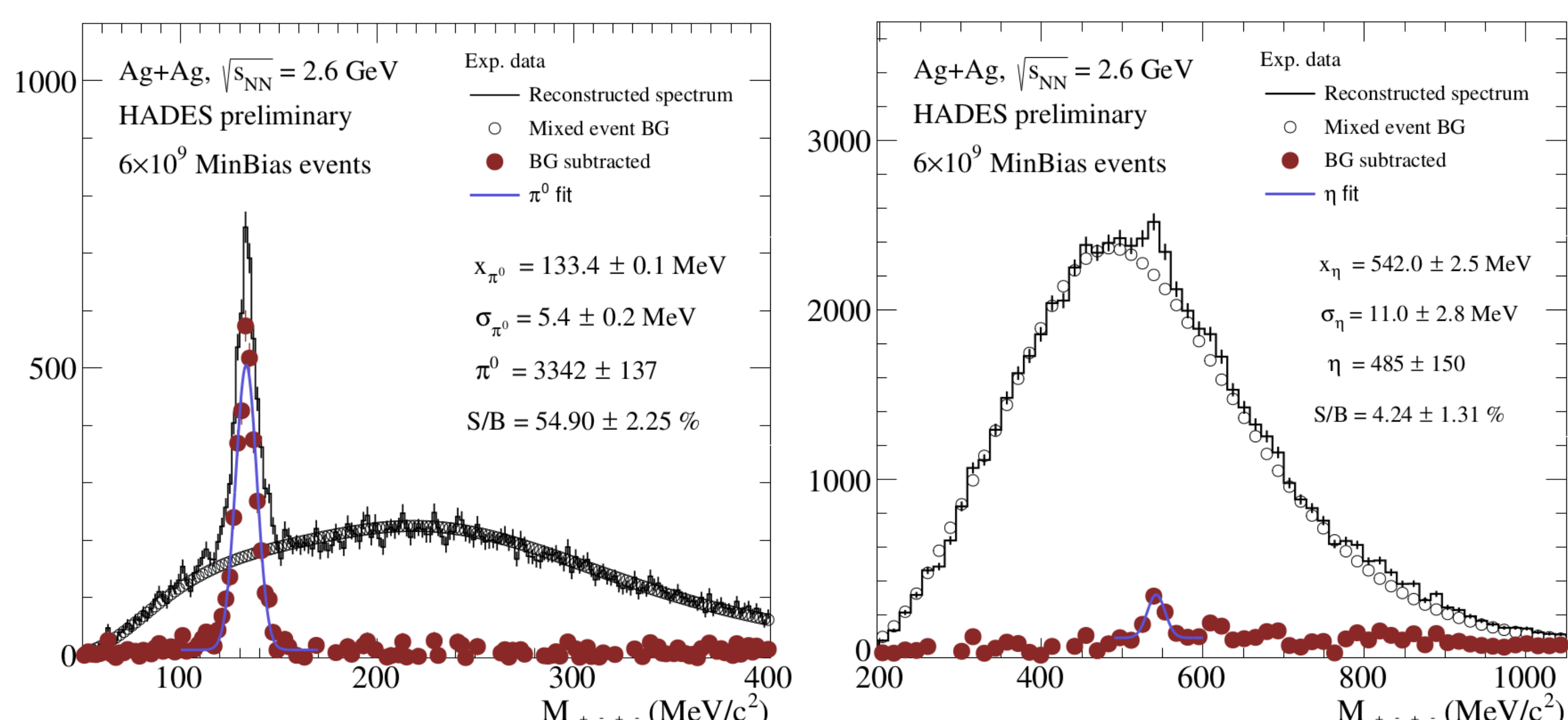
The analysis is based on a sample of 100×10^6 Au+Au collisions at 8 AGeV simulated with UrQMD event generator. The reconstruction steps include:

- tracking from Silicon Tracking System (STS) and Micro-Vertex Detector (MVD)
- PID from The Ring Imaging Cherenkov (RICH) detector
- invariant mass of lepton pair $m_{inv}(e^+e^-) < 20$ MeV/c²
- opening angle of lepton pair $\theta(e^+e^-) < 2^\circ$
- opening angle of photon pair for π^0 : $0^\circ < \theta_{\gamma\gamma} < 30^\circ$
- opening angle of photon pair for η : $10^\circ < \theta_{\gamma\gamma} < 40^\circ$



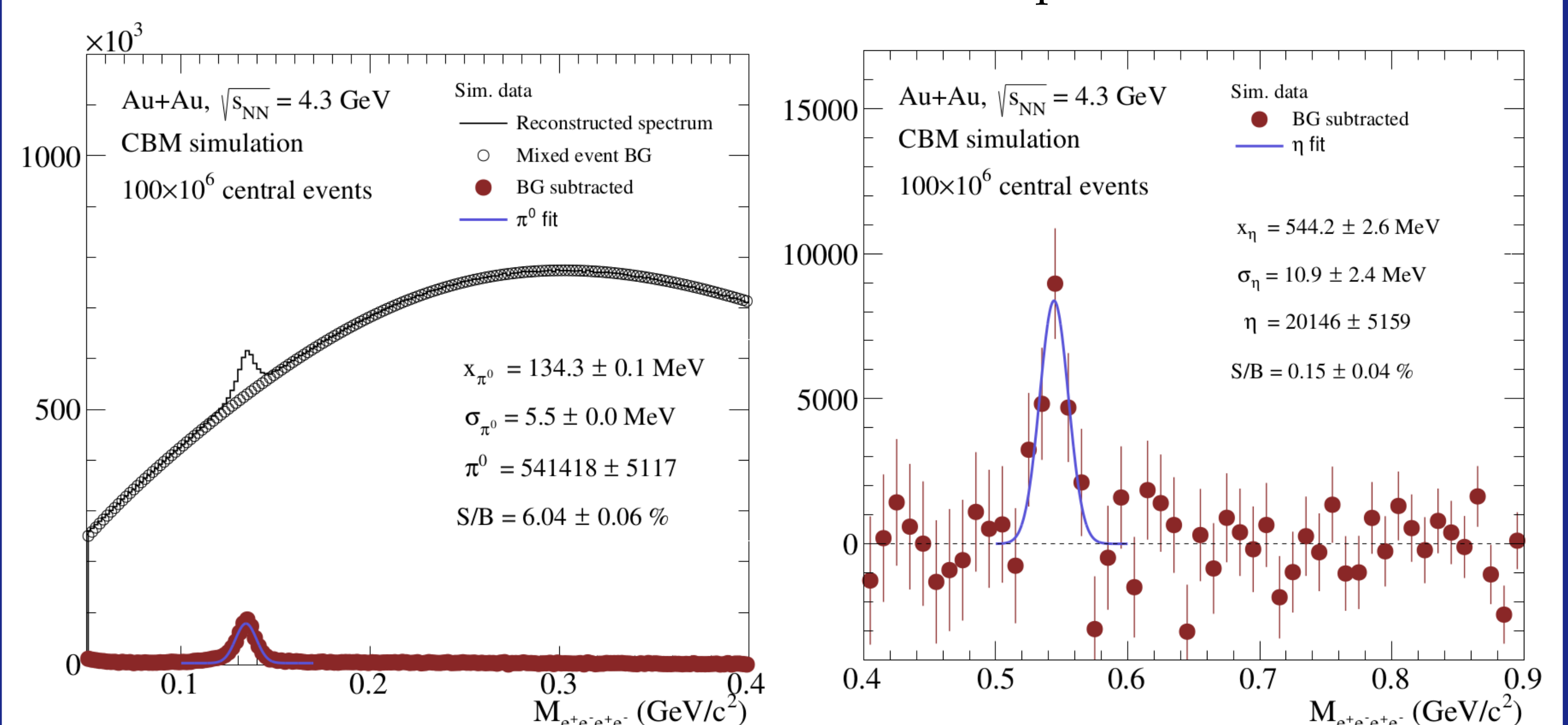
HADES results

Preliminary reconstructed invariant mass spectrum of π^0 and η mesons using conversion method from the collected Ag+Ag data.



CBM results

Reconstructed invariant mass spectrum of π^0 and η mesons using conversion method based on the simulated Au+Au sample.



Conclusion

The reconstruction of π^0 and η mesons both from the simulated data of CBM experiment and from the experimental data of HADES using conversion method has been successfully implemented. The conversion analysis allows to reconstruct both mesons within CBM and HADES experiments.

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