Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Observation of the critical end point in the phase diagram for hot and dense nuclear matter[1] ROY LACEY, Stony Brook University — Excitation functions for the Gaussian emission source radii difference ($R^2_{\rm out} - R^2_{\rm side}$) obtained from two-pion interferometry measurements in Au+Au ($\sqrt{s_{NN}} = 7.7 - 200$ GeV) and Pb+Pb ($\sqrt{s_{NN}} = 2.76$ TeV) collisions, are studied for a broad range of collision centralities. The observed non-monotonic excitation functions validate the finite-size scaling patterns expected for the deconfinement phase transition and the critical end point (CEP), in the temperature vs. baryon chemical potential (T, μ_B) plane of the nuclear matter phase diagram. A Dynamic Finite-Size Scaling (DFSS) analysis of these data suggests a second order phase transition with the estimates $T^{\rm cep} \sim 165$ MeV and $\mu_B^{\rm cep} \sim 95$ MeV for the location of the critical end point. The critical exponents ($\nu \approx 0.66$ and $\gamma \approx 1.2$) extracted via the same DFSS analysis, places this CEP in the 3D Ising model universality class.

[1]This research is supported by the US DOE under contract DE-FG02-87ER40331.A008.

Roy Lacey
Stony Brook University

Date submitted: 22 Jun 2015 Electronic form version 1.4