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# Centrality dependence of Lévy-stable two-pion Bose-Einstein correlations in 200 GeV Au++Au collisions at PHENIX

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The PHENIX experiment measured the centrality dependence of two-pion Bose-Einstein correlation functions in  $\sqrt{s_{NN}} = 200$  GeV Au

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+Au collisions at the Relativistic Heavy Ion Collider at Brookhaven National Laboratory. The data are well represented by Lévy-stable source distributions. The extracted source parameters are the correlation-strength parameter  $\lambda$

, the Lévy index of stability  $\alpha$ , and the Lévy-scale parameter  $R$  as a function of transverse mass  $m_T$  and centrality. The  $\lambda(m_T)$  parameter is constant at larger values of  $m_T$ , but decreases as  $m_T$  decreases. The Lévy scale parameter  $R(m_T)$  decreases with  $m_T$  and exhibits proportionality to the length scale of the nuclear overlap region. The Lévy exponent  $m_T$  is independent of  $m_T$  within uncertainties in each investigated centrality bin, but shows a clear centrality dependence. At all centralities, the Lévy exponent  $\alpha$

is significantly different from that of Gaussian ( $\alpha = 2$ ) or Cauchy ( $\alpha = 1$ ) source distributions. Comparisons to the predictions of Monte-Carlo simulations of resonance-decay chains show that in all but the most peripheral centrality class (50%-60%), the obtained results are inconsistent with the measurements, unless a significant reduction of the in-medium mass of the  $\eta'$  meson is included. In each centrality class, the best value of the in-medium  $\eta'$  mass is compared to the mass of the  $\eta$

meson, as well as to several theoretical predictions that consider restoration of  $U_A(1)$  symmetry in hot hadronic matter.

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