

Anomalous centrality variation of minijet angular correlations in Au-Au collisions at 62 and 200 GeV from STAR

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We have measured two-particle autocorrelations on (η, ϕ) for all unidentified charged hadrons with $p_t > 0.15$ GeV/c and $|\eta| < 1$ from Au-Au collisions at 62 and 200 GeV. The correlation structure is dominated by a peak centered at zero relative opening angles on η and ϕ which we hypothesize is caused by minimum-bias jets (minijets). We observe a large excess of minijet correlations in more-central Au-Au collisions relative to binary-collision scaling (more correlated pairs than expected from surface emission or even volume emission and fragmentation of scattered partons). We also observe a sudden and dramatic increase of the minijet peak amplitude and η width relative to binary-collision scaling which occurs at an energy-dependent centrality point. These results confirm a rapid transition of minijet correlation properties observed previously at 130 GeV [1]. There is a possible scaling of the transition point with transverse particle density. Systematic trends correspond well with the two-component systematics of single-particle p_t spectra, specifically the hard component and possible parton energy loss. The large increase of the minijet correlations from peripheral to central Au-Au collisions appears to be strongly inconsistent with thermalization in heavy ion collisions.

References

- [1] J. Adams et al. (STAR Collaboration), *Phys. Rev. C* **73**, 064907 (2006).