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Energy and System-Size Dependence of Long-Range Multiplicity Correlations from the STAR Experiment TERENCE TARNOWSKY, Purdue University, STAR COLLABORATION — The study of correlations among particles produced in different rapidity regions may provide an understanding of particle production mechanisms. Production of particles in the central rapidity region is dominated at all energies by short range correlations. Correlations that extend over a longer range are observed in hadron-hadron interactions only at higher energies. Results for short and long-range multiplicity correlations (forward-backward) are presented for several systems (Au+Au, Cu+Cu, and pp) and energies (e.g. $\sqrt{s_{NN}}$ = 200 and 62.4 GeV). These correlations are measured with increasing values of a gap in pseudorapidity, from no gap at midrapidity to a separation of 1.6 units (+/- 0.8). For the highest energy, central A+A collisions, the correlation strength maintains a constant value across the measurement region. In peripheral collisions, at lower energies, and in pp data, the maximum appears at midrapidity. Comparison to models with short-range (HIJING) and both short and long-range interactions (Parton String Model) do not fully reproduce central Au+Au data. String fusion as implemented in the Parton String Model is one possibility that has been explored to understand the behavior seen in the data. This result may indicate a reduction in number of particle sources for central Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV and the possible formation of high density matter.

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