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# The imprint of conservation laws on correlated particle production

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We present a novel approach to quantify correlations between baryon-antibaryon, baryon-baryon, and antibaryon-antibaryon pairs. For special case of Gaussian correlations, we used the Cholesky factorization [1] of the covariance matrix, while arbitrary correlations were introduced using the well-known Metropolis and Simulated Annealing [2] methods. Our approach is general enough to be used for correlations between strange and/or charm hadrons, it can also be applied to multi-particle final states. The results obtained are systematically compared to the corresponding publications from the ALICE and STAR collaborations. One focus of our analysis is to quantify the width of correlations in rapidity space. Such investigations are key to our understanding of the mechanism of baryon production at energy scales from several GeV to several TeV.

1. G. H. Golub and C. F. Van Loan, Matrix Computations, Johns Hopkins University Press, 1989.
2. N. Metropolis, A. W. Rosenbluth, M. N. Rosenbluth A. H. Teller and E. Teller, Equation of state calculations by fast computing machines, J.Chem.Phys. 21 (1953) 1087-1092

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