## WPCF 2024 - 17th Workshop on Particle Correlations and Femtoscopy



ID de Contribution: 26

Type: Non spécifié

## Three-Dimensional measurements of pion HBT correlations and their Lévy parameters in $\sqrt{s_{NN}} = 200$ GeV Au+Au collisions at STAR

mardi 5 novembre 2024 17:05 (25 minutes)

In this work, we present new results on the three-dimensional pion-pion femtoscopic correlation measurements and their Lévy parameters in heavy-ion collisions, utilizing data from the STAR experiment at RHIC in Au+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV. These measurements aim to deepen our understanding on the space-time structure of hadron emission sources and their role in the behavior of the strongly interacting quark-gluon plasma. The three-dimensional approach enables a more comprehensive investigation of the emission source properties. We focus on analyzing the transverse mass  $(m_T)$  dependence of the Lévy source parameters, including the Lévy scale parameters in the Bertsch-Pratt frame,  $R_{out}$ ,  $R_{side}$ ,  $R_{long}$ , the correlation strength parameter  $\lambda$ , and the Lévy exponent  $\alpha$ . The Lévy scale parameters provide insights into the homogeneity structure of the source, while the parameters  $\lambda$  and  $\alpha$  offer information about the correlation strength and source shape, respectively. In this talk, our 3D results are compared with previous one-dimensional studies, highlighting the differences and potential implications for understanding the space-time evolution of the system.

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