

1 Pion femtoscopy with Lévy sources in Au+Au 2 collisions at STAR

3 Máté Csanád for the STAR Collaboration

4 November 14, 2024

5 Exploring the space-time extent of particle production is an important goal of
6 heavy-ion physics and efforts have been made in order to understand the under-
7 lying physics behind the experimental observations of non-Gaussian source dis-
8 tributions. In experiments, femtoscopic (momentum) correlations are utilized to
9 gain information about the space-time geometry of the particle emitting source.
10 In this talk we present recent two-pion femtoscopic measurements performed by
11 the STAR experiment, at $\sqrt{s_{NN}} = 3.2, 3.9, 7.7, 14.5, 19.6, 27, 54.4$, and 200
12 GeV, and their description with calculations based on Lévy-distributed sources.
13 The obtained results indicate how the source shape changes with collision en-
14 ergy, centrality and transverse momentum dependence of the source parameters.
15 The comparison of data to Monte-Carlo simulations at these energies is also dis-
16 cussed. We furthermore discuss the implications of this comparison on various
17 stages of the evolution, and in particular, the explanation of the non-Gaussian
18 nature of the 3D correlations at $\sqrt{s_{NN}} = 200$ GeV.