

1 **Measurements of two-pion femtoscopy in Au+Au Collisions**  
2 **at  $\sqrt{s_{\text{NN}}} = 3.0, 3.2, 3.5, \text{ and } 3.9 \text{ GeV}$  from RHIC-STAR**

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5 for the STAR Collaboration.

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7 Femtoscopic measurements are sensitive to the spatial and temporal charac-  
8 teristics of the particle emitting-source, allowing us to probe the properties of  
9 the matter created in heavy-ion collisions. During a first-order phase transi-  
10 tion to the QGP phase, the time scale for pion emission is expected to increase.  
11 Therefore, it can help us understand the nature of the QCD phase transition.

12 In this talk, we present the results on two-pion femtoscopy measurements in  
13 Au+Au collisions at  $\sqrt{s_{\text{NN}}} = 3.0, 3.2, 3.5, \text{ and } 3.9 \text{ GeV}$  measured by the  
14 STAR experiment. The extracted correlation strength ( $\lambda$ ) and HBT radii  
15 ( $R_{\text{out}}, R_{\text{side}}, R_{\text{long}}$ ) from the 3D correlation functions will be presented as a func-  
16 tion of collision energy, centrality, rapidity, and pair transverse momentum. We  
17 will compare the measurements with the results from transport model calcu-  
18 lations. Finally, the implications for the properties of QCD matter at high  
19 baryon density will be discussed.