

1 **Nuclear modification factor of inclusive charged particles in Au+Au**  
2 **collisions at  $\sqrt{s_{NN}} = 27$  GeV with the STAR experiment**

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5 December 30, 2023

6 **Abstract**

7 The Quantum ChromoDynamics (QCD) phase diagram, often represented using co-  
8 ordinates of temperature (T) and baryonic chemical potential ( $\mu_B$ ), includes a transition  
9 from a hadronic gas phase to a quark-gluon plasma (QGP) phase. The Beam Energy Scan  
10 (BES) program at Relativistic Heavy Ion Collider (RHIC) varies the gold-gold collision  
11 energy aiming to explore the phase diagram and pinpoint the critical point. BES's initial  
12 phase (2010-2014) revealed intriguing results, including the suppression of high transverse  
13 momentum particle production ( $p_T > 2$  GeV/c) at collision energies from  $\sqrt{s_{NN}} = 62.4$   
14 to 200 GeV that is quantified by the nuclear modification factor ( $R_{CP}$ ). In 2018, STAR  
15 at RHIC collected a large-statistics dataset at  $\sqrt{s_{NN}} = 27$  GeV, ten times larger than  
16 BES-I. This poster introduces new BES-II measurements of inclusive charged particles at  
17 27 GeV, extending BES-I findings across a wider transverse momentum range with better  
18 precision. The relevant physics implications including the potential jet quenching effects  
19 at low energy collisions will also be discussed.