

NCQ scaling of $f_0(980)$ elliptic flow in 200 GeV Au+Au collisions by STAR and its constituent quark content

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Abstract

Searching for exotic state particles and studying their properties have furthered our understanding of quantum chromodynamics (QCD). The $f_0(980)$ resonance is an exotic state with relatively higher production rate in relativistic heavy-ion collisions, decaying primarily into $\pi\pi$. Currently the structure and quark content of the $f_0(980)$ are unknown with several predictions from theory being a $q\bar{q}$ state, a $qq\bar{q}\bar{q}$ state, a $K\bar{K}$ molecule state, or a gluonium state. We report the first $f_0(980)$ elliptic flow (v_2) measurement from 200 GeV Au+Au collisions at STAR. The transverse momentum dependence of v_2 is examined and compared to those of other hadrons (baryons and mesons). The empirical number of constituent quark (NCQ) scaling is used to investigate the constituent quark content of $f_0(980)$ [1], which may potentially address an important question in QCD. We will report the findings of our investigation and discuss its implications.

[1] A. Gu, T. Edmonds, J. Zhao, F. Wang, Phys. Rev. C 101, 024908 (2020), arXiv:1902.07152