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Exploring the elliptic anisotropy of hard probes in small collision systems

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The hard probes, including jets and heavy flavors, play an important role in investigating the properties of quark–gluon plasma (QGP) formed in heavy-ion collisions. The positive elliptic flow of hard probes observed in semi-central Pb–Pb collisions indicates that the hard partons suffered strong interactions in the deconfined QCD medium and then obtain the collectivity. However, recent measurements show also a non-zero v_2 for high-p_{T} charged particles and heavy flavor hadrons in high-multiplicity p–Pb collisions for both mid and forward rapidities, whose origin is still debated.

In this contribution, we employ a multi-phase transport model (AMPT) to calculate the v_2 of jet particles and open heavy-flavour hadron decay muons in p–Pb collisions at mid and forward rapidity, respectively. The results are obtained using the two-particle correlation method and the advanced nonflow subtraction strategy. We will systematically introduce how the collectivity of hard partons are generated from parton scatterings, and then propagated to the final state in small collision systems. Comparisons with experimental results will be presented as well. This work will provide further insights into understanding the origin of elliptic anisotropy of hard probes in small collision systems, and has referential value for the future measurements.

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