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Flow in small systems from parton scatterings

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We show that the incoherent elastic scattering of partons, as present in a multi-phase transport model (AMPT), with a modest parton-parton cross-section of σ=1.5-3 mb, naturally explains the long-range two-particle azimuthal correlations as observed in p+p and p+Pb collisions for all measured N_{track} and p_T bins by the LHC-CMS experiment [1]. We calculate the elliptic, v_2, and triangular, v_3, Fourier coefficients of the two-particle azimuthal correlation function in p+Pb and peripheral Pb+Pb collisions. Our results for v_3 are in a good agreement with the CMS data. The v_2 coefficient is very well described in p+Pb collisions and is underestimated for higher p_T in Pb+Pb collisions. The characteristic mass ordering of v_2 in p+Pb is also reproduced whereas for v_3 such ordering is not observed [2]. An escape mechanism has been proposed recently to explain these successful model results [3]. We investigate this issue in detail and show that collisions between active partons are directly responsible for generating the final v_n.

References:

1. Guo-Liang Ma and Adam Bzdak, Phys. Lett. B 739, 209 (2014) [arXiv:1404.4129].
2. Adam Bzdak and Guo-Liang Ma, Phys. Rev. Lett. 113, 252301 (2014) [arXiv:1406.2804].
3. Liang He, Terrence Edmonds, Zi-Wei Lin, Feng Liu, Denes Molnar, Fuqiang Wang, arXiv:1502.05572.

On behalf of collaboration:

NONE

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