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Charge azimuthal correlations at RHIC and LHC energies

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With a multi-phase transport model including initial charge separation and string melting, the charge azimuthal correlations for Au+Au collisions at center of mass energies 200, 39, 11.5, 7.7 GeV and Pb+Pb collisions at 2.76 TeV are investigated. Initial charge separations of about 10 % for 200 GeV, 5 % for 39 GeV, 0 % for 11.5 GeV appear to be necessary. This is consistent with decreasing Chiral Magnetic Effect as the incident energy decreases at RHIC. A reduced partonic interaction cross section is also needed for 11.5 GeV, indicating possible significant contributions from the hadronic stage. For Pb+Pb collisions at 2.76 TeV, 10% initial charge separation can produce similar behaviors as those at the top RHIC energy. We will also discuss how the same-charge correlation of $\langle \cos(1-2) \rangle$ changes sign from negative at RHIC to positive at the LHC.

Reference:

[1] Guo-Liang Ma and Bin Zhang, Phys. Lett. B 700 (2011) 39–43, arXiv:1101.1701 [nucl-th].

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