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Electromagnetic field induction in quark-gluon plasma due to thermoelectric effects (online)

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Quark-gluon plasma (QGP) produced in relativistic heavy-ion collisions cools rapidly as the medium evolves. QGP with non-zero conserved charged current, higher thermal conductivity of medium advances in global thermalization. Being made of electrically charged partons, heat current leads to electromagnetic (EM) field induction in the medium, commonly known as the *thermoelectric effect*. Quantum modification of the classical non-relativistic phenomenon in relativistic matter –QGP, is fascinating to explore. In this work, for the first time, we have estimated the induced electric field due to the thermoelectric effects in a QGP. This phenomenon can induce an EM field even in QGP created in head-on collisions with non-vanishing chemical potential. We found that the induced electric field is zero at the center and increases moving away from the center. For baryon chemical potential of 0.3 GeV, the maximum induced field could be as high as $1 m^2$.

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