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The effect of electric and chiral magnetic conductivities on azimuthally fluctuating electromagnetic fields and observables in isobar collisions

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We study the space-time evolution of electromagnetic fields along with the azimuthal fluctuations of these fields and their correlation with the initial matter geometry specified by the participant plane in the presence of finite electric (σ) and chiral magnetic (σ_χ) conductivities in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{NN}} = 200$ GeV. We observe the partially asymmetric behavior of the spatial distributions of the electric and magnetic fields in a conducting medium when compared to the Lienard-Wiechert (L-W) solutions, and deceleration of the decay of the fields is observed in both isobar collisions. While studying the correlation between the magnetic field direction and the participant plane, we see the sizeable suppression of the correlation in the presence of finite conductivities when compared to the L-W case, reflecting the importance of taking into account the medium properties such as conductivities while calculating the magnetic field induced observable quantities.

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